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THE Journal OF THE
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JULY, 1948 • VOLUME 37 • NUMBER 1

EFFECT OF FLUORIDES ON HARDNESS OF TOOTH ENAMEL

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THE effectiveness of various fluorine compounds in reducing enamel solubility and inhibiting dental caries has been well established.[1] However, in order to be certain that we are securing the maximum beneficial effects of these compounds, it is not sufficient merely to know that fluorine can aid in the control of caries, but it is also necessary to understand completely its action and the influence of all the variables which are involved in its application. Consequently, the emphasis in recent research in this field has been placed on determining the exact mechanism of fluoride protection.

There are some theories concerning this mechanism, backed by limited laboratory data, which appear to be sound.[2,3] It is known, for example, that the major chemical component of enamel is hydroxyapatite, $Ca_3(PO_4)_2 \cdot Ca(OH)_2$. It is believed that the soluble fluorides will react with the enamel to form insoluble fluorapatite, $Ca_3(PO_4)_2 \cdot CaF_2$. Likewise, the compounds of the heavy metals, for example lead fluoride, are supposed to form a compound such as lead fluorapatite, which is highly insoluble in organic acids. Thus fluorine by its reaction with the enamel is presumed to produce a surface which is less soluble than the original. Whether this is accomplished by an adsorption process or by an actual change in the space lattice or both cannot be stated definitely yet, although recent work by use of roentgen ray diffraction and the electron microscope seems to point to a definite chemical change on the tooth surface.[4-7]

Prize winning essay read before the midwinter meeting of the Chicago Dental Society, February 11, 1948.

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1. Moulton, F. R. (edited by), *Dental Caries and Fluorine*. Washington, D. C.: American Association for the Advancement of Science, 1946.
2. Volker, J. F., Effect of Fluorine on Solubility of Enamel and Dentin. *Proc. Soc. Exper. Biol. & Med.* 42:725 (December) 1939.
3. Volker, J. F., and Bibby, B. G., Action of Fluorine in Limiting Dental Caries. *Medicine* 20:211 (May) 1941.
4. Gerould, C. H., Ultramicrostructures of the Human Tooth as Revealed by the Electron Microscope. *J. D. Res.* 23:239 (August) 1944.
5. Gerould, C. H., Electron Microscope Study of the Mechanism of Fluorine Deposition in Teeth. *J. D. Res.* 24:223 (October) 1945.
6. Richards, A. G., and Thomassen, Lars, Microstructure of Tooth Surfaces as Revealed by the Electron Microscope. *J.A.D.A.* 31:772 (June 1) 1944.
7. Science Wins Another Victory in the Constant Battle Against Tooth Decay. *Dow Diamond* 9:1 (March) 1946.

Purpose of Investigation

If there is such a chemical change on the enamel surface when it comes in contact with fluorine either from topical application or from the drinking water, it might be accompanied by a definite physical change. Such a physical change could be associated very closely with the marked reduction in enamel solubility which is induced by fluorides. The best method of measuring accurately a physical change on the enamel surface is by a study of the hardness, although the relation of hardness to incidence of caries is not established. Therefore, the purpose of this investigation was to study, *in vitro*, the hardness of enamel as it is affected by various fluoride compounds. Also, since it is known that decalcification and solubility are accompanied by a definite softening of the enamel, it was deemed desirable to determine whether fluorine tends to prevent softening of the enamel when the tooth is subjected to the action of organic acids.

Since no data are available now on this particular phase of fluorine mechanism, a definite knowledge of alterations in surface hardness would be another step on the road to a complete understanding of its action.

It is not the purpose of this article to indicate exactly how fluorine may arrest dental caries but rather to shed additional light in regard to surface changes of the enamel when it is subjected to the action of fluorides. Furthermore, this type of study offers a new laboratory method for evaluating fluorides and other compounds. Just as solubility tests have helped to predict the clinical possibilities of flourine, so might hardness studies offer another laboratory method for screening various therapeutic reagents and for evaluating the different variables involved in their clinical use.

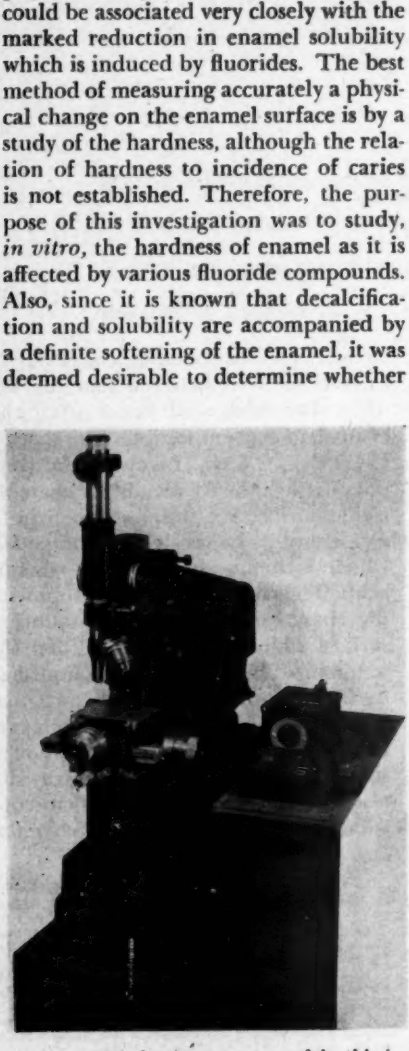


Fig. 1.—Tukon hardness tester used in this investigation

Testing Apparatus

In the past, one of the main obstacles to studying surface hardness changes of tooth structure was the lack of suitable testing apparatus. The conventional hardness testers, such as the Brinell, Rockwell and Vickers, are not suited to a study of a material such as tooth enamel. Distorted indentations and fracture of the enamel around the periphery prevent accurate hardness measurements. In a comprehensive evaluation of all the then-available instruments, Hodge found the Microcharacter Hardness Tester to be the best for this type of work, but it also has very definite limitations, particularly with enamel.[8] Because of this lack of suitable apparatus, studies relating to tooth hardness and dental caries had to be minimized even though such data would be invaluable.

8. Hodge, H. C., Hardness Tests on Teeth. *J. D. Res.* 15:271 (September) 1936.

Recently, however, an instrument has been perfected which for the first time does make possible accurate measurement of hardness changes on the tooth surface. This is the Tukon Tester, using the Knoop indenter (Fig. 1). The first published report of its use on tooth structure was by Sweeney in 1942,[9] and a more comprehensive report was made by Souder and Schoonover in 1943.[10]

Elastic recovery of indentations made with the Knoop indenter, a small pyramid-shaped point, takes place in a transverse rather than in a longitudinal direction. Consequently, from the measured length of the long diagonal and the constants of the indenter, unrecovered dimensions of an indentation are obtained. The result of the test is expressed as the Knoop hardness number, which relates the applied load in kilograms to the unrecovered projected area in square millimeters.

There are various reasons why this instrument is effective for a study of tooth structure. It makes possible the measurement of hardness of materials under light loads, 25 Gm. minimum if necessary, and on surfaces which are small in area and possibly brittle. The indentation on a sound tooth, properly prepared, is usually sharp and well defined. Also, the human variable is minimized in the use of this instrument since the application and removal of the load are controlled electronically.

The microscope, which is shown attached to the instrument, is a valuable adjunct. A very definite area can be carefully selected under the microscope and an indentation placed on that exact spot merely by sliding the mechanical stage back under the indenter. This makes it possible to use selected areas on the tooth and to place indentations close together. The latter point is particularly significant since it minimizes the natural differences in hardness between various areas of the same tooth.

Undoubtedly the Tukon Tester is the best instrument now available for this type of study, and its ability to measure accurately hardness changes in enamel made this investigation possible. However, it would be foolish to state unequivocally that the instrument and the technic for its use are without difficulties and limitations. Unfortunately there have been established no recognized methods for the use of the Tukon Tester on enamel or dentin. A great amount of time had to be spent in developing an accurate technic, and constant refinements were added as the study progressed.

Variables

Various points must be taken into consideration in perfecting a technic and evaluating the data obtained from this type of study. Not only is there extreme variability in the hardness of surfaces of different teeth, but there are also natural variations in hardness between different sections of the same tooth. This inherent difference in hardness between teeth and even adjacent areas of the same tooth may be attributed to several factors. The hardness of any tooth will be governed, of course, by the type of tooth, the age, case history, method of storing after extraction and so forth. Also the position and influence of the dentinal tubules and the enamel rods play an important role. Alterations caused by grinding and polishing and the angle at which this is done will affect the hardness measurements. Since results on only a few teeth can be misleading because of this inherent hardness variation, care must be taken in selection of the teeth. It is necessary also to test many teeth under the same conditions before a general trend can be noted accurately.

9. Sweeney, W. T., The Knoop Indentation Hardness Instrument as a Tool in Dental Research. *J. D. Res.* 21:303 (June) 1942.

10. Souder, W., and Schoonover, I. C., Abrasion and Solution of Teeth. *J.A.D.A.* 30:1725 (November 1) 1943.

In this study no tooth was used which did not produce a sharp and well-defined indentation. Also any tooth having an original Knoop hardness of less than 150 was discarded from the test.

Aside from this variation within the teeth themselves, there are other factors involved in the actual hardness measurements which must be controlled carefully to assure maximum accuracy.

1. It is absolutely essential to use a highly polished and flat tooth surface; small scratches or slightly rounded areas make accurate testing impossible.

2. An exacting measurement is dependent on a sharp and well-defined indentation, which is often difficult to obtain even with this instrument.

3. A difference in hardness numbers may be obtained on the same indentation merely by changing the angle or the intensity of the direct illumination.

4. The human variable is rather great in the reading of Knoop indentations. Even on a sharply defined indentation two different investigators may not agree exactly on the length of the indentation.

5. Sharp focus of the microscope is essential for accuracy, as a slight change in focus will alter greatly the final computed hardness number.

Because of the many variables which are involved in this study, there is some experimental error even in such a controlled research problem. However, in view of the time and effort spent on the development of an accurate technic, the care used in the selection of teeth, and the tremendous number of tests made, it is felt that the average changes noted here definitely are above this experimental error. It must be cautioned, however, that the use of this instrument for studying hardness changes on teeth requires the utmost patience and exactness.

Fig. 2.—Diagram of indentation pattern. Black diamond marks are original indentations; other three are those made after treatment with test solution

Procedure

After various methods of preparing and mounting the teeth for the hardness measurements had been tried, the following procedure was found to be the most satisfactory. Only sound and caries-free molar teeth were used, and the teeth were stored in tap water immediately after extraction. The crowns were cleaned thoroughly with pumice, and a flat exposed enamel and dentin surface was prepared by means of a fine abrasive stone. This flat surface was ground parallel to the long axis of the tooth. Scratches were eliminated by the use of progressively finer abrasive papers (0 to 4/0). The final high polish was attained by a brief buffing with a suspension of levigated alumina on a Gamal polishing cloth. Care was taken throughout this procedure to keep the tooth wet in order to prevent excessive dehydration.

After a smooth flat surface for indenting had been obtained, the crowns were mounted in a metal ring filled with plaster of paris, which provided a rigid base. The imbedding of the tooth was done in such a manner that the flat, exposed, polished surface was flush with the top of the ring and parallel to the base of the plaster cylinder. This position is essential to prevent distorted indentations. Hardness measurements always were made immediately after removal of the tooth from the test solution.

As pointed out previously, since there

is often an inherent difference in hardness between adjacent areas of the same tooth, single indentations are not adequate. A hardness difference observed between a single indentation made before the use of a test solution and one made after treatment with the solution might be due entirely to natural hardness variations within the tooth itself rather than to any effect of that particular test solution. Consequently, in order to compensate somewhat for these natural hardness variations, several adjacent indentations were made and the readings then averaged. Various indentation patterns were tried and the one which eventually proved most effective was as follows.

Two indentations were made and the original hardness number was computed as the average of the two. These original indentations are diagramed in Figure 2 as the black diamond-shaped marks. After the use of the test solution three additional indentations were made, one between the two original indentations and one on either side, as shown in Figure 2. The final hardness number after treatment was then the average of these three. This arrangement of the indentations overcomes much of the natural hardness variation within each tooth; if only one indentation per test were made, the conclusion would be less trustworthy. Since original hardness numbers will vary for each tooth, all hardness changes were computed and expressed in terms of percentage change from the original rather than as loss or gain in actual Knoop numbers. A 500 Gm. load on the indenter was used throughout the investigation.

The temperature of all test solutions was maintained at 99±0.5 F., and constant mechanical agitation was used during the treatment period. Unless otherwise indicated, after removal from the test solution the tooth surface was cleaned carefully by means of a camel's hair brush dipped in soap and water. The surface then was rinsed thoroughly with water and dried with an air syringe before being indented.

The length of time selected for treating the tooth, both with the fluorine solutions and with acid, was five minutes, which, after much experimentation with various time intervals, was found to be the optimum period. Immersion of the tooth for a longer time darkened the surface and prevented accurate measurement of the hardness indentation. Also this five minute immersion time compares closely with the four minute treatment recommended by many for clinical topical application.[11]

The relative effectiveness of fluoride solutions of various pH values is controversial although some reports have indicated a solution of lower pH to be more effective than a neutral or basic solution.[12-14] In view of this research and in order to use fluoride solutions which could be maintained at a constant pH, all solutions in this investigation were buffered to pH 4.0. Studies using unbuffered solutions are now in progress.

The data which will be presented in this article represent the average results on more than 1,800 teeth. Tests on one particular tooth, or even a series of teeth, may vary from these figures, but it is the purpose of this paper to present general trends.

Findings

Changes in Enamel Hardness.—Thirty teeth were prepared and their hardness measured in the manner previously de-

11. Bibby, B. G., The Use of Fluorine in the Prevention of Dental Caries. II. Effects of Sodium Fluoride Applications. *J.A.D.A.* 31:317 (March 1) 1944.
12. Bibby, B. G., and others, Preliminary Reports on the Effect on Dental Caries of the Use of Sodium Fluoride in a Prophylactic Cleaning Mixture and in a Mouthwash. *J. D. Res.* 25:207 (August) 1946.
13. Bibby, B. G., Use of Fluorine in Prevention of Dental Caries. III. A Consideration of the Effectiveness of Various Fluoride Mixtures. *J.A.D.A.* 34:26 (January 1) 1947.
14. Phillips, R. W., and Muhler, J. C., Solubility of Enamel as Affected by Fluorides of Varying pH. *J. D. Res.* 26:109 (April) 1947.

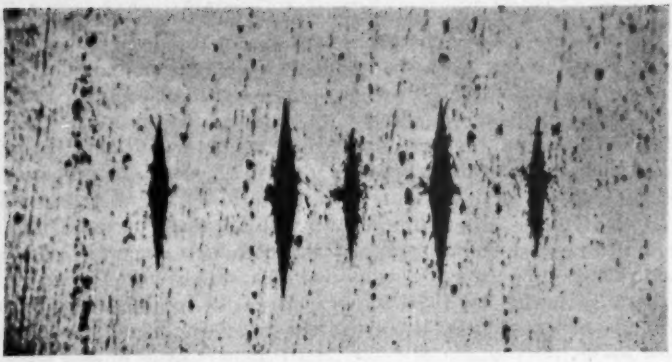


Fig. 3.—Actual Knoop indentations on enamel (X 150). The three short indentations made after immersion in fluoride solution indicate harder surface

scribed. Each tooth then was placed in a test tube and immersed for five minutes in 10 cc. of a 1:500 solution of sodium fluoride buffered to a pH of 4.0 with glacial acetic acid. After the teeth had been removed from the solution, washed with soap and water, rinsed and dried, they were re-indented. The average net change in hardness after this five minute immersion in sodium fluoride was plus 5.1 per cent. This indicates that sodium fluoride definitely does harden the enamel surface. The exact increase in hardness, of course, will vary somewhat from this figure for each tooth.

Thirty teeth also were prepared, indented and treated for five minutes with a 1:500 solution of stannous fluoride buffered to pH 4.0. The average net hardness change caused by this treatment with stannous fluoride was plus 7.1 per cent. Figure 3 shows the indentation pattern on one of the teeth. The two long indentations, the second and fourth, are the original hardness measurements, and the three shorter indentations were made after immersion for five minutes in stannous fluoride. The shorter length of the three made after fluorine treatment indicates a harder enamel surface.

This increase in hardness indicates a definite physical change in the enamel surface, and this must reflect a chemical change in the apatite molecule. The hardening of the enamel by the fluoride may not be significant in itself in regard to protecting the tooth from caries since it has not been shown definitely that a harder tooth will be less susceptible to decay. The more important fact is that these data point to a chemical change in the enamel as the fluorine mechanism.

The Protective Action of Various Fluorides. —Having established the fact that fluorine does harden the enamel surface, the following series of tests were made in order to compare the ability of various fluorides and certain other compounds to protect the enamel from the softening action of acids. Since it is known that decalcification of enamel is accompanied by a reduction in hardness, then one measure of the effectiveness of a fluoride is its ability to prevent softening of the enamel when the tooth is subjected to the action of weak organic acids. The less the reduction in hardness, the greater is the protection.

A series of thirty-two teeth were immersed for five minutes in 10 cc. of acetic acid, 0.2 molar concentration, buffered to pH 4.0 with one normal sodium

hydroxide.[15] The average net loss in hardness of these teeth when they were unprotected with fluorine and treated with acetic acid was 17.6 per cent (Fig. 4).

These same teeth were resurfaced, new hardness measurements were made, and the teeth were immersed for five minutes in stannous fluoride. As shown in Figure 4, the average increase in hardness was 7.1 per cent. After this fluoride protection the teeth were immersed in acetic acid for five minutes, and as diagramed in Figure 4, the hardness was lowered by the acid from plus 7.1 per cent to plus 1.6 per cent, a loss of 5.5 per cent. This hardness loss is only approximately one-third that obtained when these same teeth had been unprotected with fluoride before immersion in acid. Also, since the stannous fluoride had increased the original hardness, the net change was actually a gain, plus 1.6 per cent, in hardness over the original.

Several other compounds were tested and in every case the loss in hardness during immersion in acetic acid was much less when the enamel surface previously had been protected with the fluoride solution. These data are shown in Table 1. When thirty teeth were treated with acid the average loss was 17.1 per cent, but when the same teeth were protected first by lead fluoride, the average net loss in hardness was only 1.7 per cent. Thus, the actual difference between the protected and unprotected teeth was 15.4 per cent. These differences for all the solutions tested are shown in the last column—the higher the figure, the greater is the protection.

Table 1.—Average change in hardness after acid treatment of unprotected teeth and of the same teeth protected by solutions. The higher the figure in the last column, the greater the protection

Compound	Unprotected + acetic acid % change	Protected + acetic acid % change	Difference
SnF_2	−17.6	+1.6	19.2
PbF_2	−17.1	−1.7	15.4
$UO_2(NO_3)_2$	−17.6	−5.5	12.1
NaF	−17.6	−9.7	7.9

These data indicate that stannous fluoride is the most effective in maintaining enamel hardness and is followed in order by lead fluoride, uranyl nitrate and sodium fluoride. This finding compares closely with the results obtained by Muhler and Van Huysen,[16] who found that stannous fluoride was the most effective in reducing enamel solubility. Various other compounds were tested, such as zinc fluoride, copper fluoride, lead nitrate, silver nitrate and sodium acetate, but none of these showed a protective action in regard to hardness which, in our opinion, was definitely beyond experimental error.

It was noted during this study that there was a definite deposit formed on the tooth surface after immersion in the various fluoride solutions. This deposit is evident in Figure 5, left. The right

15. Lactic acid apparently more closely simulates the acid condition that exists in the mouth of a caries-susceptible person, but lactic acid is difficult to adjust to a pH satisfactory for this work. Therefore, the work of Volker, Buonocore, and Bibby was followed and acetic acid used throughout for comparing protected and unprotected enamel. (Volker, J. F., Effect of Fluorine on Solubility of Enamel and Dentin. *Proc. Soc. Exper. Biol. & Med.* 42:725, December 1939. Buonocore, M. G., and Bibby, B. C., The Effect of Various Ions on Enamel Solubility. *J. D. Res.* 24:103, April 1945.)

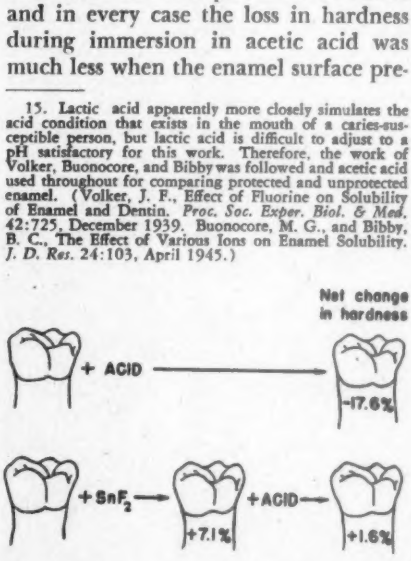


Fig. 4.—Effect of acetic acid on hardness of unprotected teeth and on teeth protected with stannous fluoride

16. Muhler, J. C., and Van Huysen, Grant, Solubility of Enamel Protected by Sodium Fluoride and Other Compounds. *J. D. Res.* 26:119 (April) 1947.

half of this tooth was covered with paraffin, after which the tooth was immersed in a 1:500 solution of stannous fluoride for five minutes. After this treatment the paraffin was removed and a photograph taken. Thus in Figure 5, left, the right half is the surface which was protected from the stannous fluoride by paraffin, whereas the left half is the portion of the tooth which came in contact with the fluoride solution and is covered with a dark deposit.

Figure 5, right, shows the same tooth after the surface was brushed thoroughly with a camel's hair brush dipped in soap and water. Very little of the deposit was removed by this treatment; likewise, rinsing in distilled water for one hour did not wash off any of it. Apparently the deposit is rather tenacious and intimately bound to the enamel surface. Some solutions left a heavier deposit than others, yet there seemed to be no correlation between the amount of deposit and the effectiveness of the solution in protecting enamel hardness. However, since it is possible that the protective mechanism of fluorine is associated closely with such a film formation on the tooth surface, the following series of tests were made to determine how pertinent a part this film does play in protecting the enamel.

After the original hardness had been measured, fifteen teeth were immersed for twenty minutes in a 1:500 stannous fluoride solution. The twenty minute immersion period was used in order to obtain a heavy deposit. Half of the tooth surface then was covered with a thin layer of tin foil and the exposed half of the tooth was brushed with a slurry of levigated alumina by means of a motor-driven brush. This brushing was con-

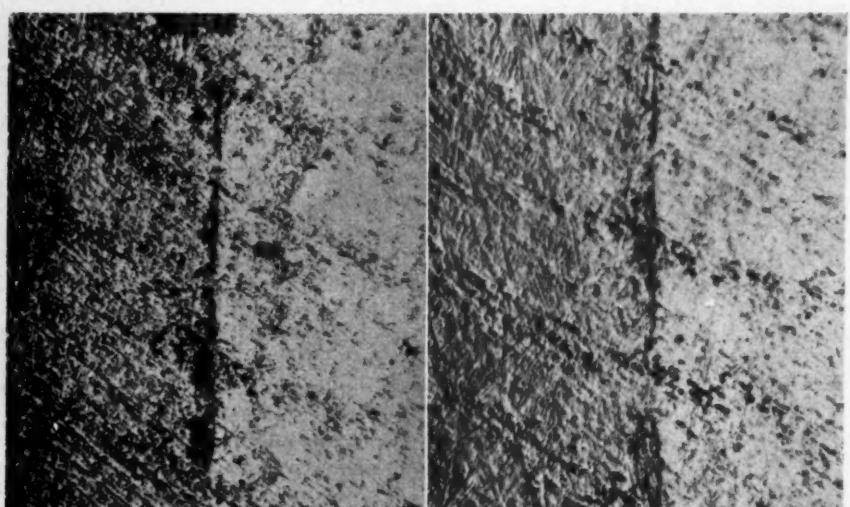


Fig. 5.—Left: Deposit from fluoride solution on left half of tooth surface. Right: Same surface except that it has been brushed with soap and water. Little of the deposit has been removed

tinued until all of the film deposited by the fluoride solution had been removed from the uncovered half of the tooth. The foil was taken off and the tooth was immersed for five minutes in acetic acid, pH 4.0. Then hardness measurements were made on each half of the tooth.

The hardness change on the half where the film had been protected by foil and thus had not been removed before immersion in acid was plus 6.2 per cent, whereas the average net change on the half of the tooth where the deposit had been completely removed was plus 7.1 per cent. The difference between these figures, 0.9 per cent, is within experimental error. Thus removal of the deposit did not alter the protective mechanism of the fluoride. Apparently this film is merely a precipitation from the highly saturated fluoride solution which was used and is not significant in protecting the surface of the tooth from the action of organic acids. The protective mechanism, therefore, must be more complex than a simple film formation on the tooth surface.

Effect of Immersion Time.—Clinical studies by Armstrong and Knutson[17, 18] showed that fifteen topical treatments are no more effective than are seven, and later reports indicate that six treatments are not appreciably more effective than four.[19, 20] Apparently the maximum effect is not attained until after a series of four treatments of four minutes each, or a total treatment period of sixteen minutes. Likewise, as shown by these preliminary studies, additional applications are not of any practical value. The following series of tests were made to determine whether hardness measurements substantiate these observations.

Table 2.—Effect of immersion in 2 per cent sodium fluoride for varying periods. Average change in resistance to softening by acid is shown in last column

Length of immersion, minutes	% increase in hardness	Protected+ acetic acid % increase
5	3.6	3.4
10	5.2	—
15	6.1	—
20	7.8	—
25	11.7	—
30	12.3	8.1
35	12.1	—

Teeth were prepared and the hardness measured in the usual manner. Then they were immersed in 10 cc. of 2 per cent sodium fluoride solution, buffered to pH 4.0, for periods of time ranging from five to thirty-five minutes. After removal from the fluorine solution the teeth were washed and dried, and hardness measurements were taken. The data in Table 2 show the average per cent hardness increase from the original for the different periods of immersion time. The graph in Figure 6 summarizes the increase in hardness as related to immersion time. It is interesting to note that these hardness results compare closely with observations that have been made both on enamel solubility and on clinical caries. The hardness increases as the treatment period is increased, going from 3.6 per cent after five minutes' immersion to a maximum of 12.3 per cent at the end of thirty minutes' immersion. However, the difference in results after twenty-five and after thirty minutes is only 0.6 per cent, which is within experimental error. Therefore these data indicate that a maximum effect in terms of hardness increase is obtained at the end of approximately

17. Knutson, J. W., and Armstrong, W. D., The Effect of Topically Applied Sodium Fluoride on Dental Caries Experience. *Pub. Health Rep.* 58:1701 (November 19) 1943.

18. Knutson, J. W., and Armstrong, W. D., The Effect of Topically Applied Sodium Fluoride on Dental Caries Experience. II. Report of Findings for Second Study Year. *Pub. Health Rep.* 60:1085 (September 14) 1945.

19. Knutson, J. W.; Armstrong, W. D., and Feldman, F. M., The Effect of Topically Applied Sodium Fluoride on Dental Caries Experience. IV. Report of Findings with Two, Four and Six Applications. *Pub. Health Rep.* 62:425 (March 21) 1947.

20. Galagan, D. J., and Knutson, J. W., The Effect of Topically Applied Fluorides on Dental Caries Experience. V. Report of Findings with Two, Four and Six Applications of Sodium Fluoride and of Lead Fluoride. *Pub. Health Rep.* 62:1477 (October 10) 1947.

twenty-five minutes or six applications of four minutes each.

When the eight teeth which had been protected for five minutes with 2 per cent sodium fluoride were placed in acetic acid for five minutes, the average per cent increase in hardness was 3.4, as shown in Table 2. However, the eight teeth treated for thirty minutes with sodium fluoride showed a net hardness increase of 8.1 per cent when placed in acetic acid. This indicates again that the protective action in maintaining enamel hardness in acids is much greater after six applications. Inasmuch as there was no softening at all but rather an actual net hardening of the enamel even after immersion in acetic acid, these data also corroborate other research indicating that a 2 per cent solution is more effective than a 1:500 concentration.[19, 21]

Method of Application.—Bibby and others[12] have stated that the most effective method of prophylactically applying fluorides is by swabbing the tooth surface with the fluorine solution. The following series of tests were made to compare the effectiveness of different methods of application in regard to hardness changes.

21. Muhler, J. C., and Van Huysen, Grant. In press.

Fig. 6.—Hardness of tooth enamel as affected by immersion time in sodium fluoride solution

Table 3.—Hardness changes after different methods of fluoride application and immersion in acetic acid

Method	Protected+ acetic acid % change
Spraying	+2.1
Immersion	+3.6
Swabbing	+9.2

Three different methods were employed: immersing, spraying with atomizer and swabbing with cotton applicator. Two per cent sodium fluoride, pH 4.0, was used, and the treatment time for each method was five minutes. After the fluorine application the teeth were immersed for five minutes in acetic acid. The per cent hardness change is shown in Table 3. In terms of hardness, these results indicate swabbing to be approximately three times more effective than either immersion or spraying. This possibly may be due to friction's bringing the solution into more intimate contact with the enamel surface. It should be kept in mind, of course, that this comparison is valid for the accessible tooth surface only. Undoubtedly the use of a spray can be a valuable adjunct during topical application in reaching those areas which are not readily accessible to swabbing.

Effect of Saliva.—To ascertain the necessity for completely drying the tooth surface before the topical application of fluorine, the following series of tests were made. Twenty-five teeth were prepared, indented and immersed in 10 cc. of a solution of synthetic saliva for twenty minutes at 99 F. The formula for the saliva was one obtained from Muhler.[22] After removal from the saliva the teeth were not dried but were immersed im-

22. Personal communication.

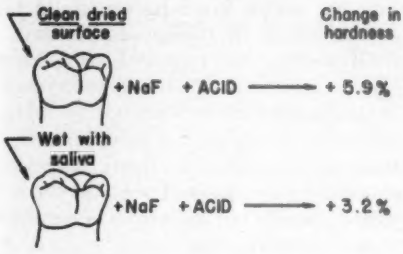


Fig. 7.—Influence of saliva on effectiveness of fluoride solution

mediately in 2 per cent sodium fluoride solution for five minutes. They then were washed, dried and placed in acetic acid for five minutes. The average net hardness change was an increase of 3.2 per cent (Fig. 7).

These teeth were resurfaced and submitted to the same treatment except that they were not immersed in saliva and were thoroughly dried before being placed in the fluoride solution. The average net hardness change was an increase of 5.9 per cent (Fig. 7). This indicates that a beneficial protective action of fluorine, in terms of enamel hardness, can be obtained even though the tooth surface is wet with saliva, as the case might be in the use of a fluorine mouthwash or dentifrice. However, the solution is more effective, 5.9 per cent as compared to 3.2 per cent, when the tooth surface has been cleaned and dried thoroughly before the fluoride application. For maximum effectiveness an oral prophylaxis is necessary at the start of a topical application to remove any debris, calculus and so forth, that would prevent penetration of the fluoride solution.

Depth of Penetration.—Although the results of this and other studies make it apparent that topically applied fluorides react with the enamel to produce a more insoluble chemical compound, there are no data to indicate the actual depth to which the fluorine penetrates and reacts with the enamel surface. Naturally, for maximum beneficial effect the protective layer which is formed should be of sufficient depth to prevent its complete removal by prophylaxis or continual use of a highly abrasive dentifrice. Therefore, a very pertinent question to be answered is whether this protective layer is merely a thin superficial one or is of sufficient depth to maintain protection of the tooth even under severe abrasive wear either from prophylaxis or from tooth brushing.

Twenty-five teeth were prepared in the usual manner and after hardness measurements, they were placed for five minutes in a 1:500 sodium fluoride solution. The average net hardness increase, due to fluoride application, was 4.5 per cent, as shown in Table 4. The teeth were brushed for one minute with a slurry of coarse laboratory pumice by means of a motor-driven Crescent polishing brush. This treatment probably is more severe than that which would be employed commonly either in prophylaxis or prolonged use of an abrasive dentifrice. After the pumice brushing hardness measurements were made again. The average change in enamel hardness from the original was plus 4.4 per cent, a loss of only 0.1 per cent resulting from this one minute brushing. This difference is certainly within the experimental error for this type of test.

If these same teeth are brushed for another minute with pumice they show a hardness increase of 2.5 per cent from the original. If the brushing is con-

Table 4.—Effect of pumice brushing on the protected enamel surface after five minutes' and twenty-five minutes' immersion

Immersion period	% Change after fluoride immersion	% Change after brushing with pumice			
		1 min.	2 min.	3 min.	4 min.
5 min.	+4.5	+4.4	+2.5	−0.6	—
25 min.	+12.7	+11.1	+13.2	+12.2	+12.7

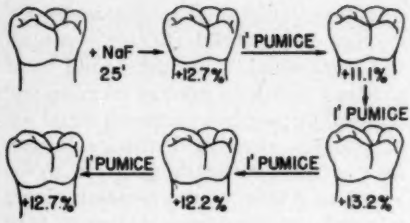


Fig. 8.—Average hardness changes as affected by brushing with pumice

tinued for one more minute, making a total brushing period of three minutes, the average net change is minus 0.6 per cent. This indicates that after three minutes' brushing all of the protective layer has been removed and new unprotected enamel exposed.

However, as reported previously, our work and that of others indicate that the maximum beneficial effects of fluorine are not obtained until after a treatment period of twenty-five minutes. Our data in regard to the depth of penetration also substantiate this statement. If the teeth are immersed in sodium fluoride for twenty-five minutes instead of five minutes the results indicate a much thicker protective layer. These results are shown in Table 4 and Figure 8.

When the teeth were immersed for twenty-five minutes in a 1:500 sodium fluoride solution, the average increase in hardness was 12.7 per cent. After brushing with pumice for one, two, three and four minutes, there was no hardness change, any difference being within experimental error. It was impossible to obtain readings after four minutes because the enamel had become too rounded for accurate measurements. Thus, after four minutes of pumice brushing the average hardness was still 12.7 per cent greater than the original. This indicates the presence of a protective layer which was not removed completely by pumice brushing. These data are of particular clinical interest since immersion for twenty-five minutes would be comparable to six topical applications.

Of course, this increased protection after twenty-five minutes of immersion, as compared with five minutes, could be due either to a greater depth of penetration or to a more complete chemical change on the enamel surface, an increased number of molecules being converted to fluorapatite.

These results give a comparative idea of the depth of fluorine penetration or the extent of the chemical change and substantiate the clinical evidence which indicates that the beneficial effects of topical applications are maintained for several years. It appears that the protective layer which is formed is of sufficient depth to withstand normal prophylaxis, tooth brushing and attrition. More comprehensive studies on the actual depth of penetration and the effects of various dentifrices are being undertaken.

It must be kept in mind that because of the necessity of having a perfectly flat test surface, the studies reported here were made entirely on freshly cut and polished enamel surfaces. The reaction of fluorides with this newly exposed enamel probably would be somewhat different from that which would occur on a normal, outer enamel surface. Although the data might vary somewhat in magnitude, it can be assumed that the general hardness results and trends presented here would be valid for the normal enamel surface.

Summary

1. It was found that certain compounds increase the hardness of enamel and likewise tend to protect the enamel from the softening action of acid. Stannous fluoride proved to be the most effective compound tested.

2. Maximum hardness was obtained after twenty-five minutes of treatment, swabbing being the best method of ap-

plication on the accessible areas.

3. The film formed on the tooth surface during immersion in fluoride solutions is not pertinent to the protective mechanism.

4. Although the solution is more effective on a dry tooth, a beneficial action, in terms of *in vitro* hardness changes, can be obtained on a tooth surface which is wet with saliva.

5. After twenty-five minutes' immersion the depth of the protective fluorapatite layer is of sufficient thickness to withstand four minutes of coarse pumice brushing.

The Tukon Tester was used to study the hardness of enamel *in vitro*, as it is affected by fluorides. This investigation offers a new laboratory method of evaluating various therapeutic reagents and, as in the case of solubility studies, can be used effectively as a screening procedure before clinical tests.

Hardness changes noted here are definite though not tremendous. As pointed out previously, these hardness changes in themselves may not be particularly significant in regard to protecting the tooth from caries, but the more important fact is that the results of this study give added evidence that the protective mechanism of topically applied fluorides is based on a chemical change on the tooth surface.[23]

23. The authors wish to acknowledge the counsel, on various occasions of Maynard K. Hine and Grant Van Huysen.

THE RELATION BETWEEN BODY TYPES AND TEMPERAMENT

Edward J. Ryan, D.D.S., Evanston, Ill.

THE orthodontist is pre-eminent among the dental specialists for his concern with the fundamental biologic processes. He is faced constantly with the genetic and environmental factors that are associated with facial malformations. He is forever aware that many malocclusions follow a familial pattern and that others are influenced by the dynamics of the environment. The orthodontist has before him at all times the dramatic evidences of growth and development, of the surging forces of anabolism, of the personality that is expanding within the developing body.

Read before the Section on Orthodontics at the eighty-eighth meeting of the American Dental Association, Boston, August 6, 1947.

The Orthodontist

Among the dental specialists, the orthodontist recognizes more clearly than any other the relation between mind and body—the psyche and the soma. He appreciates with penetrating intuition how malformations of the facial structure cast their blight on the mind and spirit. He likewise is aware that psychic stresses may find expression in regressive nervous and muscular habits that in turn disturb the balance of anatomic structures and that pervert physiologic functions. To him the principles of psychosomatic medicine are eloquent facts in clinical practice. He observes that when the body is diseased and mal-

formed, the emotions suffer; that when stresses and strains develop within the mind, they often find expression in malfunctioning of the somatic parts.

Despite his intuitive skill in recognizing the facts of psychosomatic theory, to date the orthodontist in common with all clinicians has been preoccupied chiefly with the physical structure and function of the body and has been too little concerned with the psychobiologic processes. The brilliantly conceived and carefully controlled studies on physical growth and development have not been paralleled with comparable studies on psychobiologic correlations. This omission is, I hasten to emphasize, common among all the medical and biologic arts and sciences. It is time that psychobiology in orthodontics is given more than the passing interest that it has received and becomes the subject for painstaking scientific research comparable to the magnificent anatomic, physiologic, and mechanical contributions that have been made.

A Phase of Psychobiology

One phase of the vast subject of psychobiology that should be of interest to orthodontists is the relation between body type and temperament, between the component of physical structure and dynamic behavior. The shape of the body portends the function for which it was intended. This is true in the lower forms of animal life and is also observable in man. The race horse differs from the draft horse in physique and temperament. The race horse is alert, long-legged, graceful in line, and hyperattentional. This structure was designed for the quick mobilization and expression of energy, for speed and not for sustained power. The draft horse is heavy in bone and muscle, slow, powerful and plodding. This form was intended for sustained activity and not for speed. The soaring, predatory hawk views his prey from afar and in a swift, lightning-like explosion of energy dives to the attack. The delicately designed humming bird flits from branch to branch in a nervous series of forays. The ponderous elephant differs in structure and temperament from the members of the feline family. We see, therefore, in the lower animal forms varieties in body shape, size, metabolic rate, speed of movement, length of life and the expression of nervous energy. Animals have temperament and that temperament is in some correlation with their body form. The same holds true for man.

Among present day biologists, Sheldon[1] has done more than anyone else to demonstrate the correlation between man's body shape and his basic pattern of psychologic motivation. Sheldon, in his anthropometric studies carried out at the Universities of Chicago, Wisconsin and Harvard among 4,000 young adults, found that the statics of constitutional physiology could be expressed in three basic morphologic body components or body types. These he called somatotypes. The three types of Sheldon's classification are endomorphy, mesomorphy and ectomorphy, the terms indicating the domination of one or another of the primary embryonic tissues in the body form. These three basic somatotypes describe the morphology of man at rest. When, however, man takes on motion and function, begins to express himself and to interact with his fellow men, he becomes a dynamic organism. In his dynamic function, Sheldon found clear-cut correlations between morphology and temperament.

The three temperamental traits are viscerotonia, somatotonia and cerebrotonia, associated respectively with the morphologic types, endomorphy, mesomorphy and ectomorphy.

1. Sheldon, W. H., *The Varieties of Temperament: A Psychology of Constitutional Differences.* New York: Harper & Brothers, 1944.

Basic Somatotypes

Sheldon describes the basic somatotypes:

When endomorphy predominates, the digestive viscera are massive and highly developed, while the somatic structures are relatively weak and undeveloped. Endomorphs are of low specific gravity. They float high in the water. Nutrition may vary to some degree independently of the primary components. Endomorphs are usually fat but they are sometimes seen emaciated. In the latter event they do not change into mesomorphs or ectomorphs any more than a starved mastiff will change into a spaniel or a collie. They become simply emaciated endomorphs.

When mesomorphy predominates, the somatic structures (bone, muscle, and connective tissue) are in the ascendancy. The mesomorphic physique is high in specific gravity and is hard, firm, upright and relatively strong and tough. Blood vessels are large, especially the arteries. The skin is relatively thick with large pores, and it is heavily reinforced with underlying connective tissue. The hallmark of mesomorphy is uprightness and sturdiness of structure, as the hallmark of endomorphy is softness and sphericity.

Ectomorphy means fragility, linearity, flatness of the chest, and delicacy throughout the body. There is relatively slight development of both the visceral and somatic structures. The ectomorph has long, slender, poorly muscled extremities wth delicate, pipestem bones, and he has, relative to his mass, the greatest surface area and hence the greatest sensory exposure to the outside world. He is thus in one sense overly exposed and naked to his world. His nervous system and sensory tissue have relatively poor protection. Psychologically . . . the ectomorph is the introvert, the endomorph is one type of extravert.

The digestive viscera (dominant in endomorphy) are derived principally from the endodermal embryonic layer. The somatic tissues (dominant in mesomorphy) are derived from the mesodermal layer, while the skin and nervous system, which are relatively predominant in ectomorphy, come from the ectodermal embryonic layer.

The anthropometric measurements used to determine the somatotype are standardized for normal or average nutrition within a particular age range. Therefore, those measurements which change with nutritional changes readily detect the undernourished or overnourished individual. But apparently no nutritional change can cause the measurements of a person of one somatotype exactly to simulate those of another somatotype.

Temperamental Traits

The temperamental traits are described by Sheldon as follows:

Viscerotonia (associated with endomorphy, Fig. 1), the first component, in its extreme manifestation is characterized by general relaxation, love of comfort, sociability, conviviality, gluttony for food, for people and for affection. The viscerotonic extremes are people who "suck hard at the breast of mother earth" and love physical proximity with others. The motivational organization is dominated by the gut and by the function of anabolism. The personality seems to center around the viscera. The digestive tract is king, and its welfare appears to define the primary purpose of life.

Somatotonia (associated with mesomorphy, Fig. 2), the second component, is roughly a predominance of muscular activity and of vigorous bodily assertiveness. The motivational organization seems dominated by the soma. These people have vigor and push. The executive department of their internal economy is strongly vested in their somatic muscular systems. Action and power define life's primary purpose.

Cerebrotonia (associated with ectomorphy,

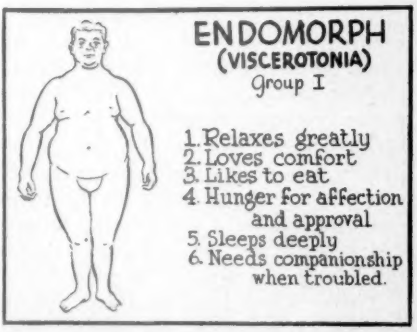


Fig. 1.—Physical structure of endomorphy with some characteristic temperamental traits

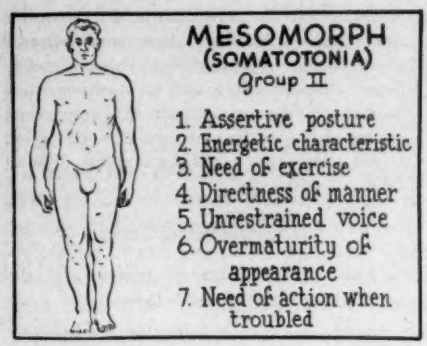


Fig. 2.—Physical structure of mesomorphy with some characteristic temperamental traits

Fig. 3), the third component, is roughly a predominance of the element of restraint, inhibition, and of the desire for concealment. Cerebrotonic people shrink away from sociality as from too strong a light. They "repress" somatic and visceral expression, are hyperattentional, and sedulously avoid attracting attention to themselves. Their behavior seems dominated by the inhibitory and attentional functions of the cerebrum. . . .

Sheldon further describes three nuclear clusters of correlated traits that are associated with viscerotonia (endomorphy), somatotonia (mesomorphy) and cerebrotonia (ectomorphy). These are listed in Figures 1, 2 and 3.

Warnings

After this brief excursion into the profound studies of Sheldon it is well to sound some words of warning: First, Sheldon makes plain that temperament is not synonymous with character. He further warns against the danger of putting people in rigid typal compartments. We must remember that Sheldon was undertaking a scientific anthropometric study and was in no sense devising shortcuts to personality analysis.

There is nothing "fatalistic" about Sheldon's philosophy. He attempted to identify and measure "the elemental or primary components of human variation." Man has within limits the power to expand his character and to develop himself. He is not cast in a mold foredoomed to remain imprisoned within a rigid framework of a body type or temperament category. Buddha was an endomorph; so too is the circus fat man. The athlete, the crusader, the explorer —men of action—are all mesomorphs; so are the gangsters. Jesus is pictured as an ectomorph type; so are the poets, the artists, and the Scrooges of this world!

The second warning is this: Every human being is a blending of somatotypes. No one can be a pure ectomorph or either of the other two types any more than the human body can be composed of one embryonic layer exclusively. The somatotypes merely indicate the dominance of characteristics.

The third warning is: The three somatotypes are not equally distributed among the population. Seltzer[2] found the following incidence of body types: endomorphy, 7.8 per cent; mesomorphy, 46.5; ectomorphy, 29.4; no component dominant, 16.2.

A Valid Question

After this brief introduction to the works of Sheldon, the question naturally arises in the mind of clinicians: "What has this to do with the affairs of orthodontic practice?" The question is a valid one. Seltzer makes it plain that adolescents compare in physical structure, as indicated by their somatotypes, with adults. In a series of 333 cases among boys in a secondary school, he found that the somatotypes of adolescents are their permanent somatotypes. This, of course, is of interest to orthodontists who are, for the most part, dealing with adolescents. It is safe to assume, therefore, that the morphologic types seen among young patients are their perma-

2. Seltzer, C. C., and Gallagher, J. R. Somatotypes of an Adolescent Group. *Am. J. Phys. Anthropol.* 4:153 (June) 1946.

nent somatotypes and that the corresponding temperamental traits as expressed in youth foreshadow their adult motivation and behavior.

Orthodontists, in their practices, are accustomed to think in terms of classification. They are conspicuous among the members of the dental profession for their insistence on classifying dental malformations according to types. It should be simple, therefore, for them to think of human body forms in terms of somatotypes, as simple as it is for them to think of malocclusions in terms of classification.

Although a malocclusion may be classified, each differs in degree, in type and in difficulty of treatment. There are no two malocclusions precisely alike any more than there are two human bodies precisely alike. When facial and dental malformations are seen against the background of a total patient, against his total physique and his temperament, it may be that the treatment approach will be entirely different. For example, I have the impression that the ectomorph, the fragile, delicately built body, is more likely to have a Class II malocclusion than either of the other two somatotypes. I also have the impression that the mesomorph, with his powerfully built bones and muscles, is more likely to have a Class III type of malocclusion.

These, I hasten to say, are merely clinical impressions and have no scientific validity whatsoever. Sheldon does speak, however, of somatotypes in terms of the facial musculature. He describes the endomorph as having the "suckling look," with his lips always formed as if he were about to partake of choice food or drink. The ectomorph, on the other hand, has a tense facial musculature and compressed, tight lips. This difference in muscular activity of these two somatotypes may be highly significant in clinical practice. I would add to this the clinical impression that the mesomorph is likely to be the one with heavy masseter and temporal muscles that undergo powerful contractions under stress. This activity of these facial muscles might cause trauma of the dental tissues and be important in orthodontic treatment.

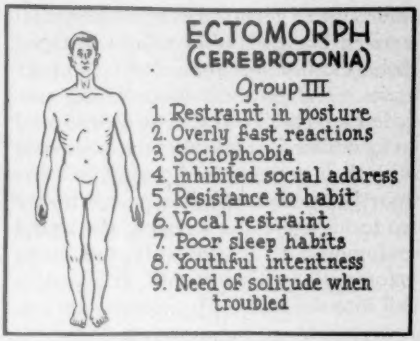


Fig. 3.—Physical structure of ectomorphy with some characteristic temperamental traits

Malocclusions

Although dentists look on malocclusions as physical deformities without character blemishes, the public associates facial disharmonies differently. The prognathous Class III malocclusion often is associated with the man of action and strong will. It carries no social stigma for a man although in a woman it may be associated with unpleasant masculine traits. The maxillary protrusion and lower facial imbalance of Class II malocclusion is, in the public eye, a stigma of masculine weakness but a feature of allure in women if not too pronounced. The Class II malocclusions are rare among movie heroes but common among movie heroines! A Class III malocclusion is probably less disastrous to a boy than to a girl, whereas a Class II malocclusion may be a badge of weakness to a boy and an asset to femininity.

Orthodontists regard malocclusions as

the result of genetic and environmental stresses, but the public thinks of facial disharmonies in terms of character traits. The physical blemish may precede the behavior trait but people tend to formulate a personality to correspond with their preconceived prototype. The assertive mesomorph is expected to live up to his aggressive persona, the round endomorph to his joviality, the linear ectomorph to his austerity. It is easy to fall into the error of projecting our preconceptions on somatotypes.

Reactions

In their reactions to painful stimuli, the somatotypes differ:

The endomorph with his complacency is not particularly apprehensive or anticipatory of pain and he reacts to the stimuli without undue perturbation.

The mesomorph shows a spartanlike indifference to pain, although minor irritations may offend his sense of order and efficiency.

The ectomorph is hypersensitive to pain. According to Sheldon: "A diagnostic hallmark is a peculiar apprehensiveness of pain, or response in advance, before the pain is actually felt. This characteristic is observed especially in the dentist's chair." People in this category have a low temperature tolerance for fluids or food taken into the mouth. They may burn their oral mucosal tissues at 131 F., whereas a mesomorph-somatotonic can tolerate a temperature of 147 F.

Research

Out of this brief introduction to constitutional anatomy, physiology and psychology I should like to make a plea for anthropometric research within the dental field to correlate body types, facial forms and dental abnormalities, or at least to determine if there are correlations. There may be some relation between tooth and arch forms and the basic somatotypes. If there is, this might be of important clinical value.

Secondly, I would urge orthodontists, because of their close association with the developing personality, to sponsor research in fundamental psychobiology. I have the impression that a person with a crippled face is crippled in spirit as well. But, so far as I know, there have never been any careful psychologic studies made of the subject. What I am urging is an expansion of the base of orthodontic research to encompass the mind and the spirit of the person with malocclusion, as well as an evaluation of him as a physical entity.

Possibly some malocclusions have a neurogenic or psychogenic origin. Imitative patterns, nervous tics, pernicious muscular habits and certain sleeping postures have all been mentioned as etiologic agents in facial disturbances. All these factors lie within the province of psychologic research. Children perform these acts not from conscious motivation but from deep inner anxieties, frustrations and desires. The act of emulation may spring from a wish to mold a personality to an imitative ideal. If the idealized subject has a nervous tic, a malocclusion, or nonphysiologic habit, the imitator may acquire the bad habit pattern along with the strong parts of character he wishes to emulate.

Man pays a large price for his gregarious nature; he may inspire others to lofty ideals and noble deeds, he may also pass along his tone of speech, his gestures, his prejudices, and his pernicious grimaces and muscular contortions. The fact that malocclusions are not diseased states in the sense of development from bacterial invasions should inspire us to search more carefully for possible neurogenic and psychogenic causes.

I have the impression that modern

children who live under the nervous tensions of the present day have more crippled faces as a result of dental disharmonies than children who lived in days of slower tempo. We are aware that the emotions may bring on bodily changes in the cardiovascular and the gastro-intestinal systems[3] and may find expression in some forms of dental disease.[3,4] The human jaws, the masticatory musculature and the teeth are part of the bodily mechanism and subject to changes in circulation, nerve conduction and discharge, and the mysterious tides of the endocrine secretions and metabolism.

We owe it to the world and to ourselves to dig more deeply into the complex etiology of malocclusions and their influence on the spirit, mind and body of man.—*708 Church Street.*

3. Ryan, E. J.: The Principles of Psychosomatic Medicine in Dental Practice, *Harvard D. Alumni Bul.* 6:9 (November) 1945.
4. Ryan, E. J.: *Psychobiologic Foundations in Dentistry* Springfield, Ill.: Charles C. Thomas, 1946.

COMPLETE MOUTH REHABILITATION THROUGH RESTORATION OF LOST VERTICAL DIMENSION

Harry Kazis, D.M.D., Boston

COMPLETE REHABILITATION of the mouth is a complex, integral part of prosthetic dentistry, requiring knowledge of physiology, anatomy, histology and physics, as well as a thorough understanding of, and ability to perform, the operative and restorative phases involved. The importance of an intelligent understanding and appreciation of these fundamentals cannot be overemphasized if the profession aims for continued progress in this direction.

The important broad field of complete rehabilitation of the mouth was comparatively unknown a few decades ago. At that time a few pioneers, Monson[1] and others, foresaw the importance of opening or "raising" bites that were obviously close, strove to correct this condition by utilizing such measures as splints, pin onlays and overlays and thus opened a new field in dentistry known as "bite raising." Gradually, it became the purpose of these men to correct bite anomalies in adults through prosthetic measures.

In its embryonic phase this art was dependent on practical experience and judgment. Insight, perception and visualization were the principal aids which guided the operator. Bite correction or bite revision, therefore, has been attacked constantly in the literature for its unscientific approach and background. However, with the growth of the field of bite raising from early endeavors, sound theoretic concepts concerning the mechanism of the human masticatory process were evolved, and well formulated fundamental technics were developed, so that today mouth rehabilitation can be effected on a scientific basis.

Early investigation in this work was

1. Monson, G. S., Occlusion as Applied to Crown and Bridge-Work. *J.A.D.A.* 7:399 (May) 1920.

based on a theory that the relation of the teeth in occlusion was responsible for the mandibular position and, consequently, that the vertical dimension or vertical height of the face was determined by the relation of the teeth.

The first departure from this concept was the theory expounded by Niswonger,[2] in 1934, that the position of the mandible is dependent on the musculature. This deduction was based on the reasoning that there is a physiologic rest position of the mandible and that this position determines the height of the face. Niswonger defined it as "that position of the mandible in which it is involuntarily suspended by the reciprocal coordination of the muscles of mastication and the depressor muscles, with the upper and lower teeth separated."

This concept has proved to be the cornerstone on which the science of mouth rehabilitation has been built. Investigations have proved that the physiologic rest position is fixed and constant. Since it does not change with age, or with the presence or absence of the teeth, it is a reliable starting point for the design of a physiologically correct bite.

Study of Mandibular Movement

The investigations which substantiated this theory were made possible by the development of a roentgenographic cephalometric method for the accurate study of the mandibular movements. The technic consists of positioning the head in a fixed reference frame and of standardizing all the component factors: the central ray, the position of the head and the x-ray film. Roentgenograms and tracings of the successive positions of the mandible then may be obtained for accurate comparative study. The tracings were recorded at the office of H. I. Margolis, Boston.

2. Niswonger, M. E., Rest Position of the Mandible and Centric Relation. *J.A.D.A.* 21:1572 (September) 1934.

The roentgenographic cephalometric method of study of the head, its pattern of growth and changes was made possible in 1931 by Broadbent.[3] Investigations by Brodie and Sarnat[4] in 1942, employing this method, have shown that the position of the mandible in relation to the head is established by the third month of life and that this relation is not altered by growth. In addition, in reporting on complete anodontia, they point out that the position and relation of the mandible to the maxilla is maintained by the muscular attachments and is not in any way dependent on the teeth.

Further investigations and roentgenographic tracings were made by Thompson,[5] utilizing the Broadbent-Bolten cephalometer. Reporting on the rest position in growing persons, orthodontic patients, edentulous adults and full and partial denture patients, he observed that the exact similarity of the facial proportions established with the mandible at rest indicates that the rest position remains constant as growth progresses, that it is a part of the inherent growth pattern of the face and that it is unrelated to the presence or absence of teeth.

As a result of these investigations, it is recognized now that the freeway space is that space existing between the physiologic rest position and the tooth contact position in a functional centric occlusion. Therefore, as the vertical dimension decreases with loss of teeth or with attritional wear of the teeth, the size of the freeway space between the mandible and the maxilla will increase. However, the physiologic rest position will remain constant, regardless of the condition or existence of the teeth in the oral cavity.

3. Broadbent, B. H., A New X-Ray Technique and Its Application to Orthodontia. *Angle Orthodont.* 1:45, 1931.

4. Brodie, A. G., and Sarnat, B. G., Ectodermal Dysplasia (Anhidrotic Type) With Complete Anodontia. *Am. J. Dis. Child.* 64:1045 (December) 1942.

5. Thompson, J. R., The Rest Position of the Mandible and Its Significance to Dental Science. *J.A.D.A.* 33:151 (February) 1946.

The development of a sound understanding of the dynamic factors in mastication completed the transformation into a science of rehabilitation of the mouth. This understanding resulted from a detailed knowledge of the nature and characteristics of the muscles. The work of a succession of investigators, Klaffenbach,[6] Waugh,[7] Pleasure,[8] Sherrington,[9] Thompson[5] and many others, led to a recognition of these facts:

1. The muscles may change in tone or activity, but their length remains constant.

2. Even when relaxed, the muscles are under a slight tension or tonus.

3. The rest position of the mandible is determined by the balance of opposing tensions of a chain of muscles while in a relaxed state.

4. Each mandibular movement is produced by a contraction of one group of muscles and a proportional relaxation of an opposing group of muscles.

The acceptance of these facts led to the realization that an accurate registration of the mandible in occlusion with the maxilla, or of a functional centric bite registration, must depend on a dynamic balance of the muscles of mastication. Accordingly, various pressure or spring-bearing instruments to register bites have been devised on the principle of simulating a dynamic balance of the musculature that produces the masticatory function. These instruments and technics for using them have been described elsewhere in the literature and now have reached a high state of development.

With the determination of the physiologic rest position as a permanent starting point for the design of a bite, and with the development of pressure or spring-bearing instruments for obtaining a balanced biting registration, the entire process of rehabilitation of the mouth has been placed on a scientifically sound basis.

From the foregoing conclusions it is obvious that the physiologic and anatomic relations between the skull and the teeth, mandible, temporomandibular articulation and muscles of the head and neck are characterized by interdependence. Should any one of these component factors fail or become defective in its functioning, the resultant effects will be destructive to the proper synchronization of the parts involved in this complex system.

Musculature

Inasmuch as the musculature with its attachments is responsible for the mandibular position and balance, a thorough understanding of the muscles involved, and of their respective functionings in relation to the mechanism of the mandible, is a prerequisite to the proper diagnosis and treatment of a case.

Briefly, the primary concern is with the muscles of the head and neck. This includes the orbicularis oris and its attaching muscles, such as the buccinator and the zygomaticus. The expression of the lips depends on the function of these muscles. It is of particular significance, therefore, that the anterior opening created by an increase in the vertical dimension of a bite will produce an effect on these muscles, which in turn will be responsible for any esthetic changes effected in the expression of the lips or mouth.

The muscles of mastication comprise the temporal muscle which raises the mandible in centric position and also retrudes the mandible; the masseter muscle, with action similar to that of the temporal muscle; the internal pterygoid, which elevates the mandible and aids in protrusive and lateral move-

6. Klaffenbach, A. O., Gnathodynamics. *J.A.D.A.* 23:371 (March) 1936.
7. Waugh, L. M., Influence of Diet on the Jaws and Face of the American Eskimo. *J.A.D.A.* 24:1640 (October) 1937.
8. Pleasure, M. A., Prosthetic Occlusion, *J.A.D.A.* 24:1303 (August) 1937.
9. Denny-Brown, D., *Selected Writings of Sir Charles Sherrington.* New York: Paul B. Hoeber, Inc., 1940.

ments, and the external pterygoid, the principal action of which is the protrusion of one or both condylar heads. Since these muscles are largely responsible for elevating the mandible and for producing the lateral, protrusive and retrusive movements of the mandible, they must be considered carefully when changes are being made in the position of the mandible for purposes of restoring lost vertical dimension, and their action must be balanced properly and coordinated to obtain the utmost functional efficiency.

The muscles of depression of the mandible are the mylohyoid, the geniohyoid, the genioglossus, the infrahyoid, the digastric and the external pterygoid. These muscles aid in the action of opening the mouth, but their primary function is to assist in swallowing by raising the tongue and elevating the hyoid bone. They aid in obtaining the physiologic rest position by depressing the mandible.

As indicated previously, it is becoming recognized that the muscles do not change in length. They may vary in tone or activity, but their length remains constant throughout life. This basic factor must be kept in mind in considering increases in vertical dimension. It is particularly significant that since the mandible assumes its relation to the skull early in life, the vertical dimension of the face necessarily is established at that time and remains proportionately constant throughout life. Therefore, treatment of a closed bite is not designed to increase the vertical dimension, inasmuch as this would imply an increase beyond the normal, but is intended as a means of restoring the amount of vertical dimension that has been lost.

Temporomandibular Joint

In addition to a thorough knowledge of the muscles of mastication, an insight into the mechanism of the temporomandibular joint and the intricate, delicate operative procedures connected with it is essential to success in rehabilitation of the mouth, particularly in a case involving the opening of the bite.

Gray[10] describes the temporomandibular articulation as consisting of two distinct joints, one between the condyle and the articular disk and another between the disk and the mandibular fossa.

Normally, when the mouth is opened slightly, the mandible rotates with the condyle acting as a pivot. On opening wide, in addition to the condyle rotating on the articular disk, there is also a gliding of the condyle with the disk, the two actions occurring simultaneously.

A malocclusion may manifest itself in the region of the joint, because if the occluding surfaces of the teeth do not articulate properly, part of the pressure during mastication may be borne by the temporomandibular joint.

To illustrate how the musculature be considered in revising a bite, an exand the temporomandibular joint must ample can be made of a bite with an excessive amount of closure. The forceful, upward drive of the mandible to make and maintain contact with the maxillary teeth would result in an extreme closure of the bite in addition to some attritional wear of the teeth. In such a bite, where there has been a great loss of vertical dimension, this condition may be accompanied by a gradual closure of the space between the head of the condyle and the articular disk. In other words, the condyle might be forced into direct contact with the disk, compressing the synovial membrane that enables it to glide smoothly in the fossa. The effects of the constant harsh contact of the condyle with the disk, without benefit of any intermediate lubricatory substance, would produce such damaging

10. Gray, Henry, *Anatomy of the Human Body*. Twenty-first edition. Philadelphia: Lea and Febiger, p. 299.

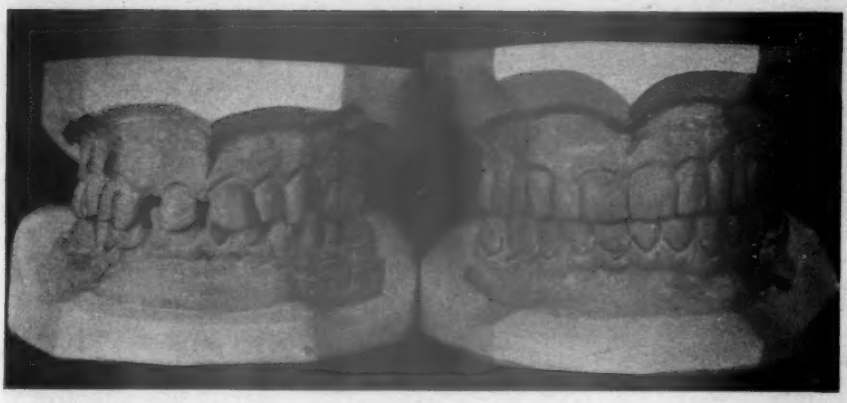


Fig. 1, Case 1.—Casts of original and rehabilitated bite, showing correction of deep overbite with diastemata of incisor teeth

results as wear of the articular disk, possible degenerative effects on the auditory nerve and surrounding anatomic structures and pain and discomfort during mandibular motions.

Effects of Over-Raising

Treatment of a patient with extreme closure must include consideration of the position of the condyle in its fossa. If the bite is over-raised, the already existing conditions may become greatly aggravated. The excessive amount of opening will result in even greater damage to the joint. Inasmuch as the joint is a hingelike attachment operating as a rotary lever with a gliding motion, excessive opening of the bite produces a forward repositioning of the condyle, thereby merely shifting the existing disturbances to a new region and creating additional derangements. Furthermore, the increased opening results in undue pull on the musculature, stretching the muscles beyond their normal length. The strain on the muscles produces pain, discomfort and constant nerve tension.

It has been observed, in dentulous as well as edentulous patients, that after a substantial period, one to two years, the muscles will return to their normal length, but only after a sacrifice has been made through development of detrimental changes in the oral cavity. The

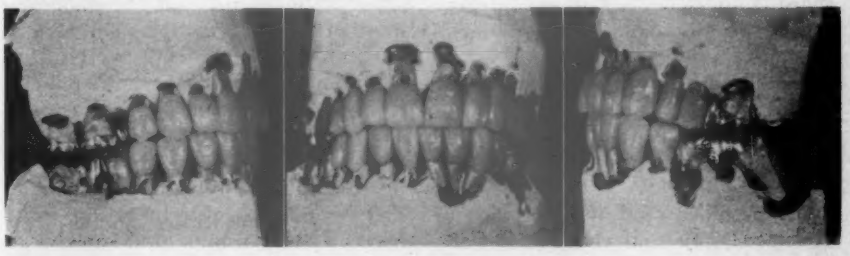
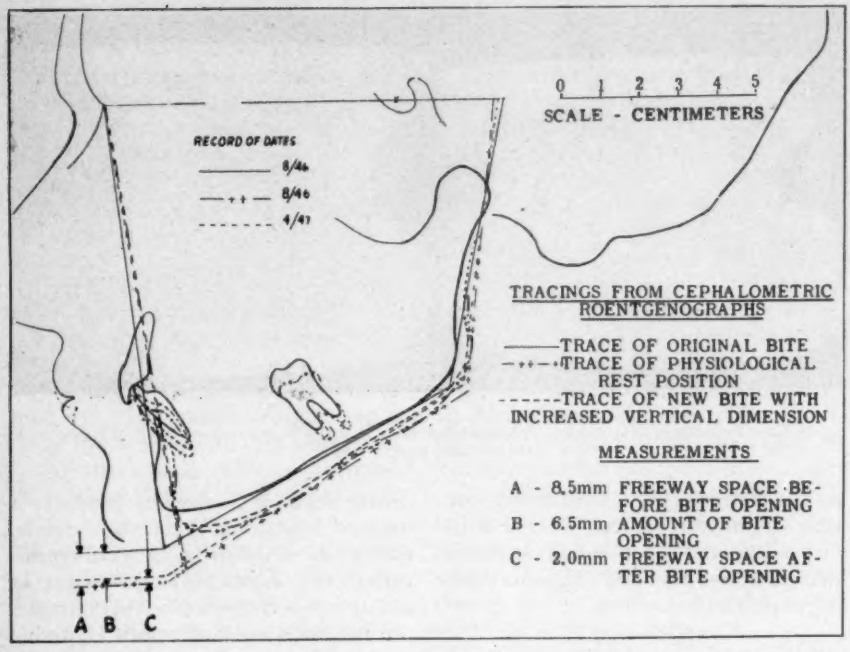


Fig. 2, Case 1.—Completed restorative work on master models, showing use of porcelain jacket crowns and gold onlays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TRACINGS FROM CEPHALOMETRIC ROENTGENOGRAPHS
TRACE OF ORIGINAL BITE
TRACE OF PHYSIOLOGICAL REST POSITION
TRACE OF NEW BITE WITH INCREASED VERTICAL DIMENSION
MEASUREMENTS
A - 8.5mm FREEWAY SPACE BEFORE BITE OPENING
B - 6.5mm AMOUNT OF BITE OPENING
C - 2.0mm FREEWAY SPACE AFTER BITE OPENING
A B C

Fig. 3, Case 1.—Roentgenographic cephalometric tracing of patient, showing that 6.5 mm. of bite opening was established. An allowance of 2.0 mm. remained for freeway space within the physiologic rest position

return of the strained musculature to normal length will be effected by a resorption of the underlying alveolus and surrounding tissues, resulting in possible loosening or depression of the teeth and gingival trauma. In other words, the muscles involved will resist this constant strain and as a result will force the dentition into a new arrangement which permits the musculature to assume a rest position that is comfortable, as well as a sufficient amount of freeway space for function. This results in the changes described.

Inadequate Bite Opening

On the other hand, if a bite with an extreme closure is not changed, or if the lost vertical dimension is not restored, the occlusal surfaces of the teeth being merely restored so as to occlude properly and maintain occlusal equilibration, then the position of the condylar head will remain in close contact with the articular disk. As a result, the previously described conditions become progressively worse. The already excessive amount of freeway space, translated into action, means that the mandible must travel a greater than normal distance to contact the maxilla, resulting in undue force applied by the muscles in bringing the mandible into contact with the maxilla. In addition the muscular tone will become affected by the lost vertical dimension, and the muscles will become sluggish in action. The effects will be trauma and soreness to the muscles involved, as well as injury to the underlying alveolus and tissues.

Fig. 4, Case 2.—Left: Original appearance of bite before treatment, showing acute prognathous condition with loss of 21 mm. of vertical dimension. Right: Side view of completed restorative work with increase in vertical dimension

Plan for Bite Revision

Physiologic Rest Position.—Proper treatment of a patient with excessive closure of the vertical dimension would require first that the proper physiologic rest position of the patient be determined. There are several methods for securing this position, the most widely accepted being to tire the depressor muscles. When these muscles have been tired sufficiently, the mandible will assume a true physiologic rest position; that is, a position in which the mandible is separated from the maxilla by a minimum amount of muscular contraction necessary to resist gravity. This position may be referred to as the starting point of the bite.

A sufficient allowance must be made for freeway space. Roentgenographic studies by Maves have determined the freeway space to be close to the assumed value of 2 mm. in most cases. However, the exact amount of freeway space should be determined independently in

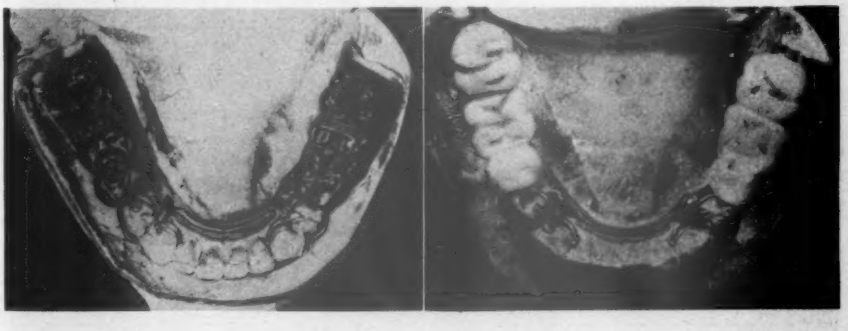
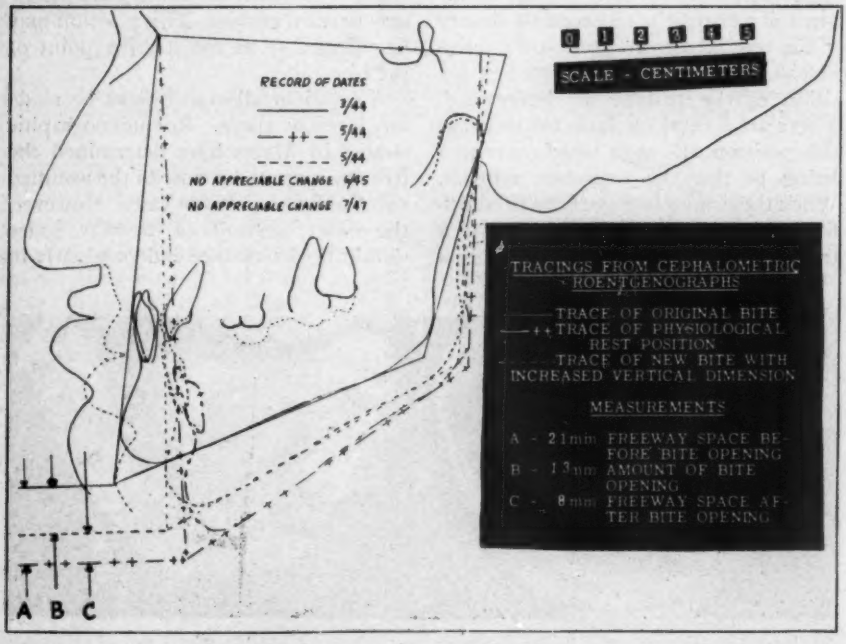


Fig. 5, Case 2.—Left: Occlusal view of restoration by means of lingual bar, with wax teeth carved prior to insertion in mouth for the purpose of recording patient's mandibular movements under equalized stress. Right: Completed restoration by means of lingual bar. Wax teeth have been processed and reproduced in acrylic

each individual. The amount of freeway space to be allowed can be determined by the amount of vertical dimension that has been lost. It will be found that the greater the amount of vertical dimension lost, the more freeway space should be allowed.

It is necessary to consider the age of the patient. A younger person will tolerate a greater increase in the vertical dimension and will become adjusted more easily to a decrease in the freeway space as necessitated by the new changes. However, it is advisable to make an allowance for more freeway space rather than to leave an inadequate amount.

After the allowance for freeway space has been made, the resulting position is the normal functional occlusion for the individual, determined from his own physiologic rest position. This may be referred to as the stopping point of the biting action. Roentgenographic cephalometric study of the temporomandibular joint at this point will reveal that the change in the condylar position is a vertical one; that is, the head of the condyle will have dropped in a vertical direction, relieving its direct contact with the articular disk. Studies of such cases by means of roentgenographic cephalometric tracings, such as accompany the case reports presented in this paper, verify this fact and show that if the vertical dimension is restored within the boundaries set by the physiologic rest position, the change effected in the position of the condyle will be a vertical one, with no appreciable anteroposterior shifting. There will be relief of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SCALE - CENTIMETERS
TRACINGS FROM CEPHALOMETRIC ROENTGENOGRAPHS
TRACE OF ORIGINAL BITE
TRACE OF PHYSIOLOGICAL REST POSITION
TRACE OF NEW BITE WITH INCREASED VERTICAL DIMENSION
MEASUREMENTS
A - 21mm FREEWAY SPACE BEFORE BITE OPENING
B - 13mm AMOUNT OF BITE OPENING
C - 8mm FREEWAY SPACE AFTER BITE OPENING
A B C

Fig. 6, Case 2.—Roentgenographic cephalometric tracing of patient, showing excessive freeway space before bite opening. The change in the condylar position is a vertical one with no anteroposterior shifting

any pressure in the region of the joint as the mandible will be allowed freedom of movement.

Functional Centric Position.—Of equal importance in rehabilitating a bite is the consideration of an accurate, balanced centric occlusion. Proper interdigitation of the tooth cusps when they occlude on an anatomic articulator will not result necessarily in a properly balanced centric position in the mouth. Since the stresses and forces applied by the musculature are responsible for positioning the mandible at rest, as well as

Figure 7, Case 2.—Front views and profiles of the patient. Above: Before treatment. Below: After treatment

Fig. 8, Case 3.—Casts of bite before and after treatment, showing prognathous condition and restoration

in function, it is obvious that a balance of the muscles first must be secured.

This fact becomes particularly significant when it is recognized that the action of two corresponding muscles is not necessarily simultaneous.[11] For example, when a bolus of food is between the teeth, first the muscles on one side of the mandible are activated during the masticatory process, while the corresponding muscles on the other side act as stabilizing agents to balance the action; then the muscles reverse their roles. An arrangements of reciprocal performance is in function. It is of primary importance that this pattern of operation be observed closely when a functional centric position is registered. Furthermore, in order that the restorations may be constructed to conform with this arrangement, it also is necessary that a protrusive position of the mandible be registered under stress to orient the plane of occlusion.

Many valuable scientific studies have been made for the purpose of constructing anatomic articulators that will resemble closely the mandibular movements. Unquestionably, there is a definite need and place for anatomic articulators, but they are not intended as a direct means of establishing or balancing the occlusion for any mouth. They should be utilized as a means of transference and maintenance of a balanced registration that already has been established in the mouth.

No more precise articulator can be desired than the mouth itself. Each case presents particular problems, the form and function of no two condyles being the same and the action and pull of any two sets of muscles varying widely.

11. Kazis, Harry, *Planning and Treatment for Bite Raising.* Chapter 2, Mechanics of Mastication. New York: Dental Items of Interest Publishing Co., 1943.

Fig. 9, Case 3.—Original appearance of bite (right side view)

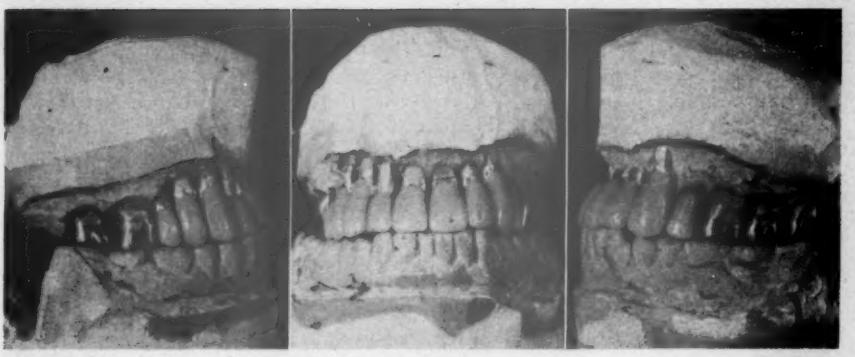


Fig. 10, Case 9.—Completed restorative work on master models, showing use of porcelain jackets crowns and gold onlays

Therefore, it is possible to consider only certain known tendencies and functions as being fundamentally common to these factors. Since the mouth is a dynamic, living structure where changes are occurring continually, it cannot be reproduced precisely in a static, mechanical device. It is essential that an accurate and scientific method for intraoral registration of balanced centric occlusion be employed.

The knowledge that the musculature is responsible for the mandibular action has resulted in much investigation with the result that many technics and instruments have been developed. Through a thorough and progressive study of these methods and precision instruments, the pressure or spring type of instrument was evolved and it simulates best the biting pressure exerted by the muscles during function. Since there is considerable stress and pressure being exerted by the muscles during the masticatory process, it follows that a proper balance of the muscles must be obtained while they are actually in a state of function.

From this consideration it readily can be observed that if a registration is made at the physiologic rest position when a proper balance of the muscles has been obtained, the related intraoral factors such as the teeth and their cusps nearly always will become balanced when occluded.

At this point, the balanced registration obtained in the mouth can be transferred to any articulator with the assurance that the record and index will be maintained securely.

Reports of Cases

In the cases reported here the roentgenographic cephalometric method was used for diagnosis and for checking results of treatment. The "adjustable x-ray cephalostat" is described by Mar-

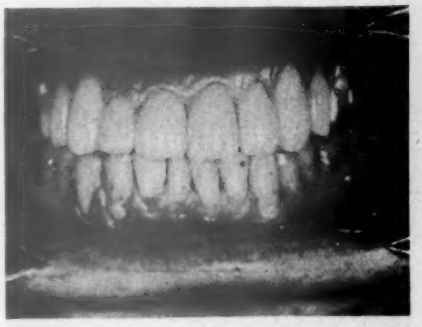


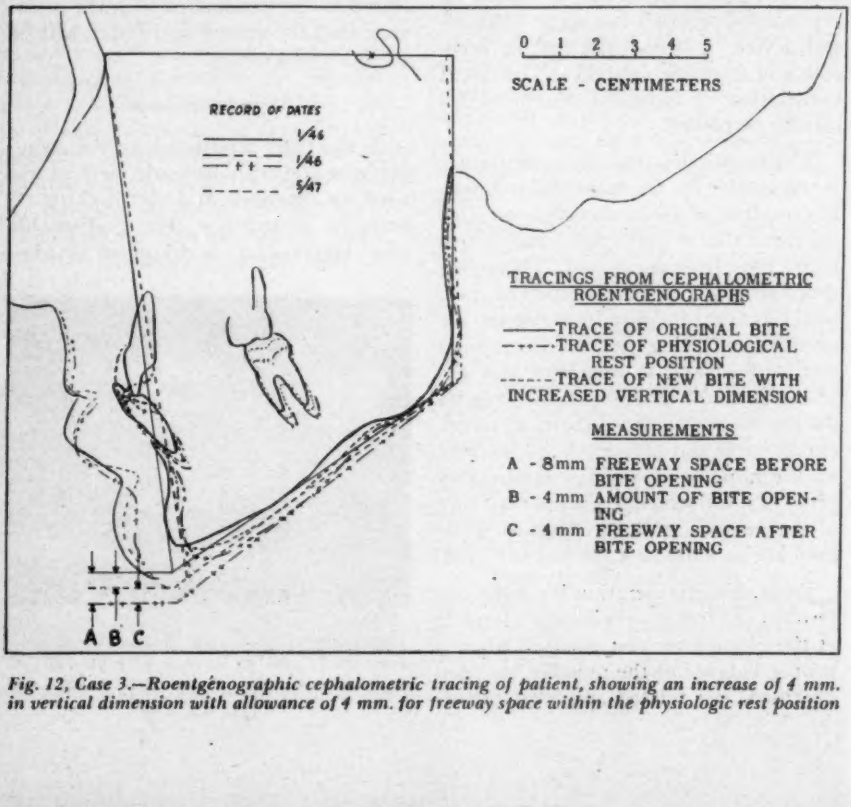
Fig. 11, Case 3.—Front view of completed restorative work, with an increase of 4 mm. in lost vertical dimension. Bite has been corrected and slight overbite accomplished

golis[12] as a precision instrument designed for the purpose of holding the head and the x-ray negative in a recordable, reproducible relation to each other as well as to the central ray. It is possible to obtain a succession of roentgenograms of the same patient at various intervals, with the assurance that the head is maintained in the same position for accurate, comparative tracings. Such studies afford a reliable basis for comparison of the mandibular position and the condylar region before and after restoration.

In all the cases reported here the rest position of the mandible was used as a guide so that there was no over-raising of the bite. The excessive amount of freeway space existing between the rest position and the functional position of the teeth in occlusion was filled in by means of onlays or partial restorations posteriorly and porcelain jacket crowns anteriorly. Furthermore, in all cases the bite registration was obtained with the mandible under stress, by use of an intraoral type of pressure bearing instrument, so that the completed restorative work would satisfy the dynamic, functional conditions existing in the mouth during the masticatory process, as well as produce a satisfactory and esthetically pleasing result in a static condition.

In this study, calibrated measurements were used to determine the physiologic rest position and the occlusal or contact position of the mandible. Measurements may be made from any convenient point on the upper portion of

12. Margolis, H. I., Standardized X-Ray Cephalographics. *Am. J. Orthodont.* 26:725 (August) 1940.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TRACINGS FROM CEPHALOMETRIC ROENTGENOGRAPHS
TRACE OF ORIGINAL BITE
TRACE OF PHYSIOLOGICAL REST POSITION
TRACE OF NEW BITE WITH INCREASED VERTICAL DIMENSION
MEASUREMENTS
A - 8mm FREEWAY SPACE BEFORE BITE OPENING
B - 4mm AMOUNT OF BITE OPENING
C - 4mm FREEWAY SPACE AFTER BITE OPENING
A B C

Fig. 12, Case 3.—Roentgenographic cephalometric tracing of patient, showing an increase of 4 mm. in vertical dimension with allowance of 4 mm. for freeway space within the physiologic rest position

Fig. 13, Case 4.—Casts of edge to edge bite, before and after treatment

the face to any point on the mandible. The points used are arbitrary and are selected as convenient aids. The vertical dimension may be determined from the nasion to the gnathion; from a point on the medial line of the frontal bone to the symphysis, or from a point on the nose to the symphysis. In other words, the measurements may be effected from any convenient point on the mandible to any fixed point on the maxilla. Measurements reported in this study were made from a point on the nose to a point on the symphysis.

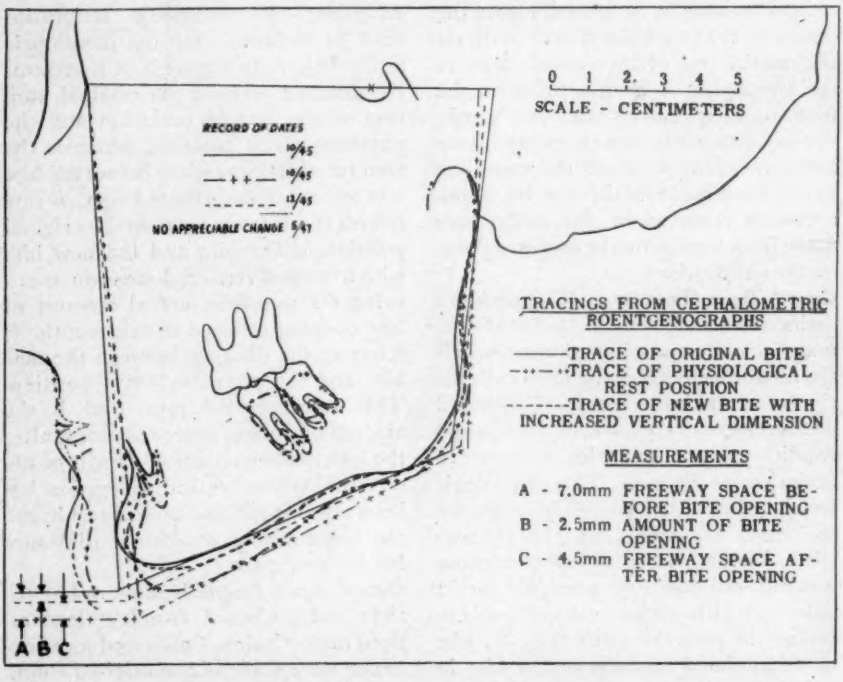
Case 1, Deep Overbite. — The patient's malocclusion was complicated by diastemata as well as attritional wear on all the incisor teeth, resulting in an extreme closure of the bite (Fig. 1). Calibrated measurements were made of the original condition of the bite with the teeth in occlusion at 80 mm. The physiologic rest position of the mandible measured 88.5 mm. Allowing 2 mm. for freeway space, 6.5 mm. of lost vertical dimension was restored, utilizing porcelain jacket crowns on all anterior teeth and gold onlays on the posterior teeth (Fig. 2). The new functional position of the bite in occlusion with the completed restoration in the mouth measured 86.5 mm. The roentgenographic tracing (Fig. 3) demonstrates the successive positions of the mandible: the original position in occlusion; the completed restorative work in occlusion, and the physiologic rest position. In Figure 3, *A* represents the distance between the original position of the bite in occlusion and the physiologic rest position, which is the amount of freeway space before the bite was opened, measuring 8.5 mm. *B* represents the distance between the original position of the bite and the new bite with increased vertical dimension, measuring 6.5 mm.—the actual amount of bite opening restored in this mouth. *C* refers to the distance between the new bite and the physiologic rest position. This measures 2.0 mm. and is the amount of freeway space remaining after the bite has been opened. It will be observed that the vertical dimension has been restored within the limits set by the rest position with a sufficient allowance for freeway space.

Case 2, Acute Prognathic Bite. —The patient had a Class 3 (Angle's classification) malocclusion. Calibrated measurements were made of the original condition of the bite in occlusion at 77 mm. (Fig. 4, left). The physiologic rest po-

sition of the mandible measured 98 mm. Therefore, an excessive freeway space of 21 mm. existed in the mouth before treatment. In rehabilitating this bite an allowance of 8 mm. was made for freeway space, and 13 mm. of lost vertical dimension were restored to the patient. Figure 4, right, shows the completed condition of the bite after insertion of porcelain jacket crowns, gold onlays and a lingual bar.

The procedure used in constructing the partial denture in this case was as follows: Wax teeth were carved anatomically to the new functional bite that already had been established. The lingual bar and wax teeth (Fig. 5, left) were inserted into the mouth. With a stress bearing instrument, the patient reproduced his mandibular movements with left and right lateral excursions under equalized distribution of stress. The tracings that were recorded on the wax teeth then were reproduced in acrylic resin (Fig. 5, right).

The roentgenographic tracing in Figure 6 clearly illustrates the successive positions of the mandible before and after treatment and at the physiologic rest position. It will be observed that a sufficient allowance was made for freeway space well within the rest position. Furthermore, study of the position of the condyle head shows that the change in the position of the condyle was a vertical one with no appreciable anteroposterior shifting. Roentgenographic cephalograms of this patient taken more than three years after the work was completed revealed that no appreciable change had taken place in the position of the mandible or the condyle and that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TRACINGS FROM CEPHALOMETRIC ROENTGENOGRAPHS
TRACE OF ORIGINAL BITE
TRACE OF PHYSIOLOGICAL REST POSITION
TRACE OF NEW BITE WITH INCREASED VERTICAL DIMENSION
MEASUREMENTS
A - 7.0mm FREEWAY SPACE BEFORE BITE OPENING
B - 2.5mm AMOUNT OF BITE OPENING
C - 4.5mm FREEWAY SPACE AFTER BITE OPENING
A B C

Fig. 14. Case 4.—Roentgenographic cephalometric tracing of patient, showing an increase of 2.5 mm. in vertical dimension with an allowance of 4.5 mm. for freeway space

the bite had not closed. Figure 7 consists of cephalometric photographs of this patient before and after treatment. To be noted particularly is the change in the contour of the face.

Case 3, Prognathic Appearance.—The patient's bite had the appearance of a Class 3 malocclusion because of an underdeveloped maxillary arch (Fig. 8). The original condition of the bite in occlusion (Fig. 9) was measured at 88 mm. The rest position was recorded at 96 mm., resulting in a freeway space of 8 mm. before the bite was opened. Allowing 4 mm. as sufficient freeway space, 4 mm. of lost vertical dimension was restored. The entire restorative work was accomplished on the maxillary teeth only, using porcelain jacket crowns and gold onlays (Fig. 10). With the restorations completed, by utilizing the lost vertical dimension it was possible to produce a slight overbite, allowing functional efficiency and satisfying esthetic conditions (Fig. 11). The roentgenographic tracing in Figure 12 demonstrates the successive positions of the mandible and proves that this bite was not opened beyond the patient's physiologic rest position.

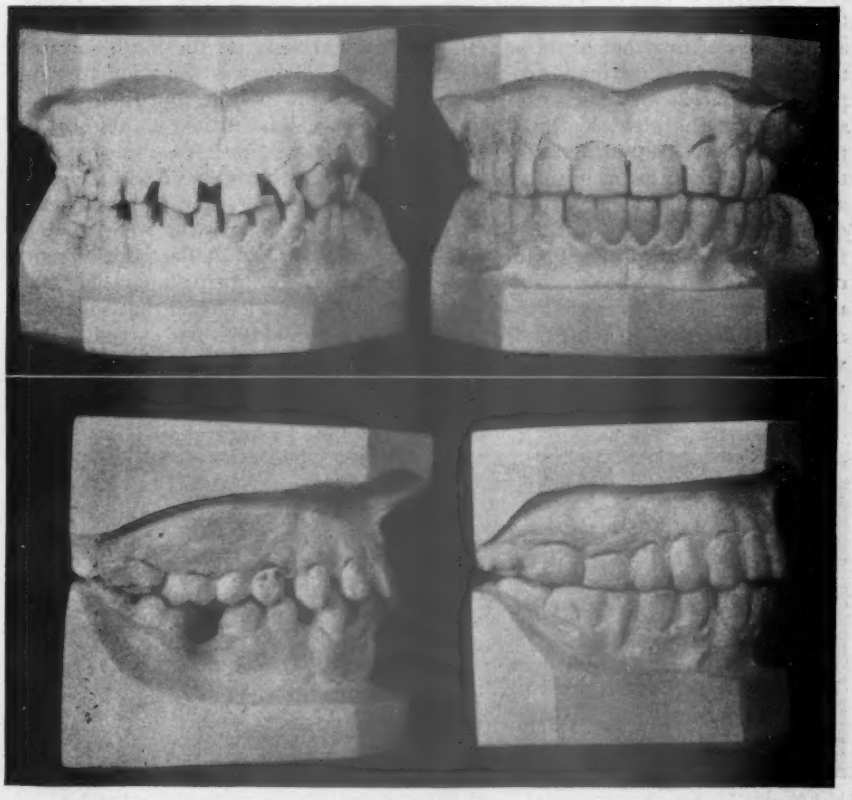


Fig. 15, Case 5.—Casts of bite before and after treatment. Above: Correction of overbite and diastemata. Below: Correction of marked protrusion of anterior segment

Fig. 16, Case 3.—Left: Original appearance of mouth, showing closure of bite with loss of 9.5 mm. in vertical dimension. Center: Bite plane in position. Right: Crib appliance with labial wires constructed to retract anterior segment and to close interproximal spaces

Case 4, Edge to Edge Bite.—The patient, a man aged 63, had an edge to edge bite with extreme attritional wear of all the teeth, resulting in a severe closure of the bite (Fig. 13). The roentgenographic tracing in Figure 14 demonstrates the amount of opening that could be instituted without endangering the condylar position or sacrificing desirable freeway space within the physiologic rest position. However, because of the age of the patient and the condition of the alveolus and the teeth, it was not deemed advisable to open this bite to the full extent permissible. The original condition of the bite in occlusion measured 72 mm. The rest position was recorded at 79 mm., leaving a freeway space before bite opening of 7 mm. The vertical dimension was increased only 2.5 mm., and an allowance of 4.5 mm. remained for freeway space. In treating this patient an occlusal bite plane was constructed to accommodate the patient to the proposed increase in the vertical dimension and to prevent any further attritional wear on the tooth surfaces. The bite plane was worn for approximately eight months, and then permanent work was utilized to restore the vertical dimension. The missing posterior teeth were replaced with a partial lingual bar restoration, and onlays and porcelain jacket crowns were used to maintain the mandibular position more accurately. The roentgenographic tracing in Figure 14 verifies that the established opening does not exceed the patient's physiologic rest position and also demonstrates that a liberal allowance

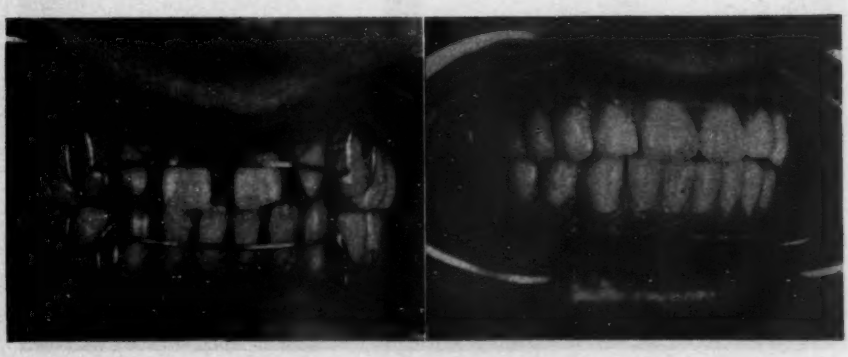


Fig. 17, Case 3.—Left: Front view, showing retraction of anterior segment after five months of orthodontic therapy. Right: Side view of completed restorative work

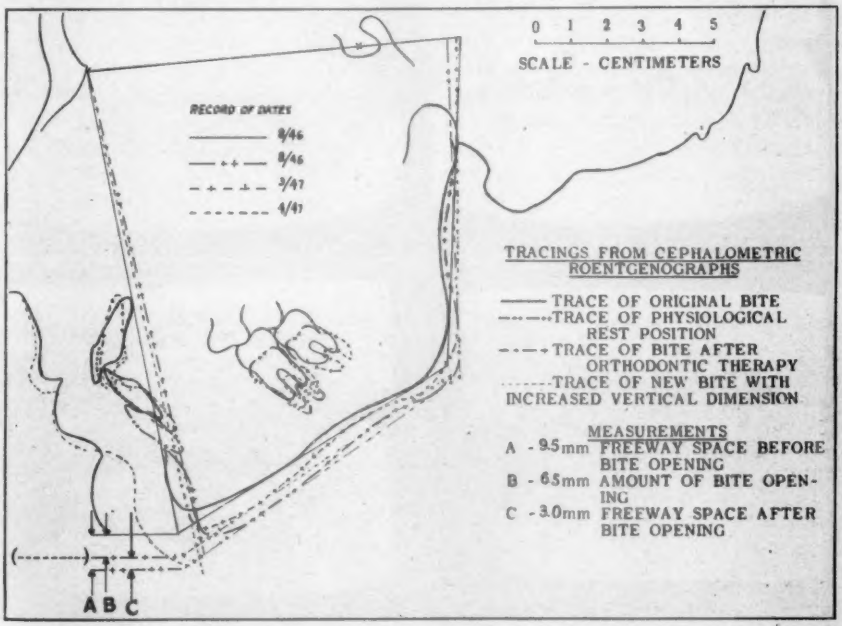
has been made for freeway space.

Gradually it is becoming recognized that there is a close correlation between the orthodontist and the prosthodontist. Both are concerned with correcting existing anomalies and preventing continued breakdown or degeneration of a bite.

Because of the structure and physiologic functions of the oral cavity and its underlying supporting tissues, the orthodontist must proceed with caution. He is handicapped often in restoring proper function in adults, and sometimes even in children. Prosthodontia is indicated and should be instituted when the orthodontist is unable to continue or has proceeded within limitations. The work of the prosthodontist in rehabilitating a mouth is to maintain the new position or alignments of the teeth by means of prosthetic measures. Illustrative of this are the following cases:

Case 5, Close Overbite.—The patient's overbite was complicated by a marked protrusion of the entire anterior segments of both the mandible and the maxilla with excessive diastemata between the incisor teeth (Fig. 15). The original bite in occlusion measured 86 mm. (Fig. 16, left). The rest position of the mandible was determined at 95.5 mm. Therefore, allowing 3 mm. for freeway space, it was possible to restore 6.5 mm. of lost vertical dimension.

Orthodontic therapy was utilized to retrude and depress the anterior maxillary and mandibular teeth. In addition, the appliances aided in closing the interproximal spacings of the teeth. Figure 16, center, illustrates the bite plane that was constructed to accommodate the pa-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TRACINGS FROM CEPHALOMETRIC ROENTGENOGRAPHS
TRACE OF ORIGINAL BITE
TRACE OF PHYSIOLOGICAL REST POSITION
TRACE OF BITE AFTER ORTHODONTIC THERAPY
TRACE OF NEW BITE WITH INCREASED VERTICAL DIMENSION
MEASUREMENTS
A - 9.5mm FREEWAY SPACE BEFORE BITE OPENING
B - 6.5mm AMOUNT OF BITE OPENING
C - 3.0mm FREEWAY SPACE AFTER BITE OPENING
A B C

Fig. 18, Case 5.—Roentgenographic cephalometric tracing of patient, showing that 6.5 mm. of bite opening has been established with 3.0 mm. of freeway space remaining within physiologic rest position

tient to the proposed increase in the vertical dimension. After the bite plane had been worn approximately four months, the bite was maintained permanently and rehabilitated posteriorly with gold onlays and porcelain jacket crowns. Crib appliances for both the maxilla and the mandible were constructed with labial wires to retract the incisor teeth (Fig. 16, right). These appliances were kept in position for an additional four months, and the incisor teeth were retruded as shown in Figure 17, left. At that time porcelain jacket crowns were placed on all anterior teeth, and the interproximal spacings were completely closed as shown in the photograph of the completed work, Figure 17, right. The roentgenographic tracing in Figure 18 shows the successive positions of the mandible and proves that this mouth was rehabilitated within the physiologic rest position.

Case 6, Class 2 Malocclusion. – The patient required correction of an excessive overbite with a bilateral crossbite and suffered from linguoversion of all the mandibular teeth, caused by collapse of the mandibular arch. This resulted in a complete lack of occlusion (Fig. 19). There was an extreme elongation of the upper molars in contact with the lower ridge as a result of lack of mandibular support. The excessive overbite had

Fig. 19, Case 6.—Casts of Class 2 malocclusion before and after treatment. Above: Excessive overbite with loss of 10 mm. in vertical dimension. Below: Complete lack of occlusion on all teeth caused by linguoversion of mandibular arch

Fig. 20, Case 6.—Views of original condition of bite, showing excessive overbite

resulted in a loss of 10 mm. of vertical dimension (Fig. 20). Orthodontic treatment was begun to expand the lower arch, particularly in the bicuspid region of the right side, by means of a lingual appliance. A Hawley plate was used on the maxillary arch to increase the vertical opening (Fig. 21). Acrylic boxes filled with gutta percha were used to produce an upward vertical force in the molar region to increase further the vertical opening (Fig. 22). At the end of six months it was possible to institute prosthetic measures in this case.

The original condition of the bite in occlusion was measured at 65 mm. The physiologic rest position, after the mandible had been tired, measured 75 mm. The functional rest position, allowing 3 mm. for freeway space, measured 72 mm. There was a variance of 10 mm. between the original condition of the bite in occlusion and the physiologic rest position, and 7 mm. between the original bite and the funtional rest position. Therefore, it was possible to reclaim 7 mm. of space in rehabilitating the bite. A partial lingual bar restoration was used to replace the missing lower teeth; onlays were used on the posterior teeth, and porcelain jacket crowns were constructed on the anterior teeth. (Fig. 23). By means of orthodontic measures along with the prosthetic restorations, it was possible to restore functional efficiency successfully.

Of the hundreds of patients with malocclusion and bite anomalies that I have examined and treated, only 5 per cent, on presentation, complained of temporomandibular disturbances or discomfort. The vast majority were concerned principally with improving esthetic appearances, with tooth preservation and functional efficiency. The small percentage affected by discomfort usually were cases where an unbalanced occlusion had caused trauma of the teeth as well as of the joint; unilateral and some bilateral malocclusions where the condyle had no balance of operation, or acutely locked or extremely deep overbites, where the condyle was in its furthest retruded position in the glenoid fossa.

Summary and Conclusions

Complete rehabilitation of the mouth which involves restoring a bite that is

Fig. 21, Case 6.—Hawley plate in position to increase vertical opening

Fig. 22, Case 6.—Casts with orthodontic appliances in position. A lingual appliance was used to expand the lower arch, and acrylic boxes filled with gutta percha were used to produce upward force in molar region for increasing vertical opening

broken down, as well as restoring function to a mouth, is unquestionably an important phase of dentistry today. Many controversial articles have appeared on the subject with cautions for the purpose of discouraging "bite raisers."

It is true that in the past one had to exercise much deliberation to avoid the many pitfalls. Of late, however, the introduction of new scientific procedures has made it possible to undertake this work with a reasonable amount of security and confidence. Particularly the contribution of the roentgenographic cephalometric method of study has enabled the operator to check his work through the various intermediate stages and to compare the end results with the original condition, thus affording assurance that the bite has not been opened beyond the rest position and that no changes will be suffered by the patient in the region of the temporomandibular joint.

Undoubtedly, in the early stages of bite raising, some patients were incorrectly treated by those pioneering in this work, without the guidance of the present advanced technics. However, it is to be noted that in general the work was done with great caution by men with extensive experience. The critical comments in the literature have served as a salutary influence on practitioners to proceed with restraint in this new field.

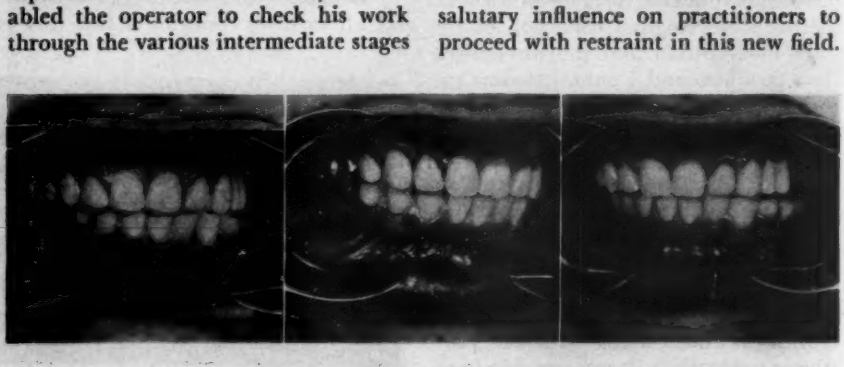

Fig. 23, Case 6.—Completed restorative work. Left: Vertical dimension increased 7 mm. Center: Articulation in posterior region. Right: Sufficient vertical space created for insertion of a partial lingual bar

Therefore, in spite of the failures that were inevitable at first, the men pioneering in this work should be encouraged. It is only as a result of their findings that the scientific procedures at our disposal today were made possible. Further investigations and studies, both practical and theoretic, should be encouraged. The student of dentistry should become acquainted with the possibilities of complete rehabilitation of the mouth early in his career.—*483 Beacon Street.*

CONSIDERATION OF THE FACE IN ORTHODONTIC DIAGNOSIS

F. Copeland Sheldon, D.D.S., Kansas City, Mo.

When the word "face" is mentioned among orthodontists it may convey two, or perhaps more, separate meanings. One is that of its growth and development, with all that these terms imply; the other is that of esthetic appearance or balance of facial lines, as characterized by the soft tissue.

To one who is interested solely in the evolution of developmental levels from those of the lower vertebrates to those of human beings, or to one whose scientific eye is trained on the cause and effect of different developmental trends in man, the subject of esthetics may seem of lesser importance. To the artist, esthetics or facial appearance probably plays the uppermost role. The orthodontist, meanwhile, has the problem of facing squarely both of these meanings, and he cannot consider himself fundamentally grounded unless he understands them and can complement one with the other.

The investigations of such men as Hunter[1] and Brash[2] among the earlier workers, and the more recent findings of Todd,[3,4] Helman,[5] Broadbent,[6,7] Krogman,[8] Brodie[9] and others have been of invaluable aid to the orthodontic profession. It could not be urged too strongly that every orthodontist review the work of these men and study and correlate their findings. Although the task may seem formidable the reader will be repaid many times over.

Facial Growth and Development

One need not fear that a study of this sort will lead to no practical end, for it is almost impossible to realize the implications of our everyday clinical observations of the face without a fairly sound, basic understanding of what these investigators have found. Unless one has some idea of the process by

Presented at the midwinter meeting of the Chicago Dental Society, February 1947.

1. Hunter, John, Natural History of the Human Teeth. London, 1771.
2. Brash, J. C., *The Growth of the Jaws and Palate.* London: Dental Board of the United Kingdom, 1924.
3. Todd, T. W., Facial Growth as an Objective Record of Child Health. *Angle Orthodont.* 9:20 (January) 1939.
4. Todd, T. W., The Orthodontic Value of Research and Observation in Developmental Growth of the Face, *Angle Orthodont.* 1:67 (April) 1931.
5. Hellman, Milo, Diagnosis in Orthodontia and the Method of Technique I Use in Practice. *Angle Orthodont.* 13:3 (January and April) 1943.
6. Broadbent, B. H., The Face of the Normal Child. *Angle Orthodont.* 7:183 (October) 1937.
7. Broadbent, B. H., Bolton Standards and Technique in Orthodontic Practice. *Angle Orthodont.* 7:209 (October) 1937.
8. Krogman, W. M., Growth Theory and Orthodontic Practice. *Angle Orthodont.* 10:179 (October) 1940.
9. Brodie, A. G., Some Recent Observations on the Growth of the Mandible. *Angle Orthodont.* 10:63 (April) 1940.

which the face of the patient arrived at its present form, one would be at a loss to know what should or should not be done in regard to facial balance in the treatment of malocclusion. Also, one must know what nature intended and just how much of nature's plan has been fulfilled (Fig. 1).

A distinction should be made between the terms "growth" and "development." Growth is an increase in dimensions, whereas development is a change in proportions. Development does not necessarily accompany growth (Fig. 2).

Those dentists who spend most of their time and energy in clinical practice might consider the appearance of the patient's face as their immediate and most important problem. However, they must not lose sight of the fact that it is the bony structures which must be dealt with.

It is difficult to compose an essay in which the face is discussed without feeling a desire to plunge headlong into the vast amount of material available on facial growth and development and to review goodly portions of it. Although space will not permit this, heredity as a factor in facial development cannot be ruled out. On the other hand, the face is, to a degree, a record of the child's health.

Enough evidence exists to conclude rather definitely that the basic structures of the face are not influenced by orthodontic treatment. Although correct mechanical procedures can greatly benefit the facial balance and expression in certain types of patients, this is only in direct proportion to the level of good growth and development at which the facial structures have arrived (Fig. 2).

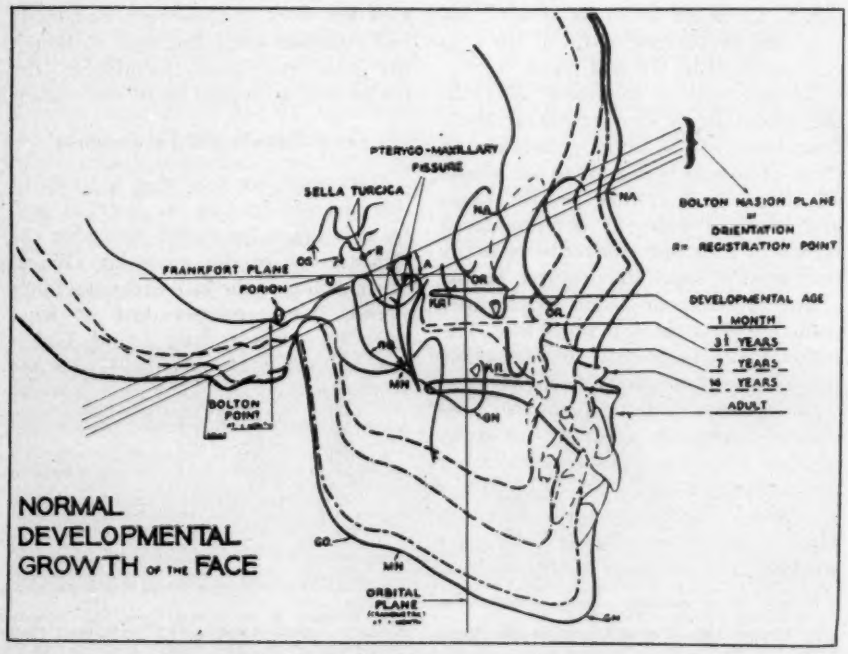

Fig. 1.—Normal developmental growth of the face (Broadbent)

Fig. 2.—Difference between growth and development. The skull at left is that of a 4 month old infant, and the other two are those of 18 year old adults. The skull in the center shows the same proportions as that of the infant. It has grown but not developed. The skull on the right shows changes in proportions as well as in size, illustrating normal development as well as growth (Todd)

Aims

In 1943, I[10] presented a discussion on a purely mechanical aspect of orthodontic treatment, the anchorage problem. I still hold the belief, expressed in that article, that,

> If we are to undertake to correct malocclusion mechanically, it seems necessary that each of us have in mind some valid reason for doing so. I believe most of us would agree that the prime objectives could be listed as: (1) a pleasing and nice arrangement of teeth, (2) a denture in normal occlusion and functionally efficient and stable enough to withstand the test of time and (3) a face that is within the limits of harmony and balance. If we cannot attain these, I see no reason for attempting the correction of malocclusion at all.

Further on in the article the statement was made, "It is difficult to conceive that an operator may institute mechanical treatment without a thorough analysis of the case at hand and a carefully designed plan of treatment."

The obligation of the orthodontist to the patient is more than the mere alignment of teeth. Also, it is more than what, in his or the patient's opinion, constitutes an improvement over the original condition, especially in regard to tooth arrangement. In the past few years many in the profession have come to realize the inadequacy of the small percentage of results which are successful from the standpoint of tooth arrangement and denture stability, and they have taken measures to perfect their diagnosis or case analysis as well as their mechanical technic. An increasing number of orthodontists are realizing that one of their prime obligations to the patient is a careful study of the face, with consideration of its developmental pattern, its balance or lack of balance, and the influence which various orthodontic measures would have on these factors.

The Ideal Face

More and more, I believe, members of the profession are coming closer to agreement on what constitutes the ideal result. Agreement on this fundamental point will eliminate a great deal of the confusion which has been so rampant in the past. Although all dentists will not agree absolutely with me as to what constitutes the ideal result, the opinions will not be so different that all comparison is lost.

Some readers may recall the photo-

10. Shelden, F. C., Problem of Anchorage in the Treatment of Malocclusion. *J.A.D.A.* 31:222 (February 1) 1944.

graph of a girl which appeared in an article by Tweed[11] in 1941. This photograph shows clearly a face that is an ideal to a clinical orthodontist and the goal toward which he is constantly striving. On the other hand, one must agree with Tweed that it is quite impossible to arrive at this ideal in every case. Tweed selected this face because he liked it. So far as I know, no measurements, cephalometric appraisal or study of developmental trends entered into this selection; it just represented an esthetic ideal.

In November, 1946, I attended a meeting at which Broadbent discussed the more recent work of the Bolton study. At this time he showed slides illustrating measurements and developmental trends of many individuals whose facial growth and development, as determined by cephalometric appraisal, had reached good or better-than-good levels. A composite of these was made, and a person was selected whose cephalometric measurements coincided with this composite. A photograph was made of this face.

This represents another approach and another concept of the ideal face. It was no surprise that there is close correspondence between the faces selected as ideals by Tweed and by Broadbent. It is my understanding that others are making a study, the results of which will give us another concept of the ideal face. It is significant that more than one isolated group is focusing attention on facial esthetics and its bearing on orthodontic diagnosis, prognosis and treatment.

Essentials for Diagnosis

A study of even a small group of facial photographs will quickly reveal differences in developmental patterns. Most important is the fact that no orthodontic diagnosis or case analysis is complete or sound without a thorough appraisal of the face. This includes a study of the face itself, photographs, and, I am now convinced more than ever, at least lateral roentgenograms of the head. The plaster model alone is virtually valueless. It can be clearly demonstrated that plaster models in 2 cases can be almost identical so far as tooth arrangement and classification of the malocclusion is concerned, yet a careful analysis of the faces may show entirely different development levels which will greatly affect the treatment procedures (Fig. 3).

Removal of Dental Units

Into any discussion of this nature sooner or later there must be injected the question of whether the removal of dental units in the correction of certain types of malocclusion is justified. As most of us are quite familiar with practically all the arguments, for and against, it is not necessary to discuss these point by point. Lately, however, some orthodontists have expressed the opinion that the removal of dental units is justified as a treatment procedure for mechanical reasons only. In other words, if faulty tooth arrangement or malocclusion is present to such a degree that the limitations of mechanical movement are too great, the removal of teeth is justified. This might be compared with the opening of one eye to see whether it is safe to open both eyes so that the whole scene can be viewed.

Anyone who has been in the practice of orthodontics for a reasonable length of time knows that it is possible to arrive at some sort of result by positive mechanical methods in the treatment of almost any orthodontic patient. It is reasonable to suggest, then, that the cause of any dissatisfaction with results should be studied carefully. Con-

11. Tweed, C. H., The Application of the Principles of the Edgewise Arch in the Treatment of Malocclusions: II, *Angle Orthodont.* 11:13 (January) 1941.

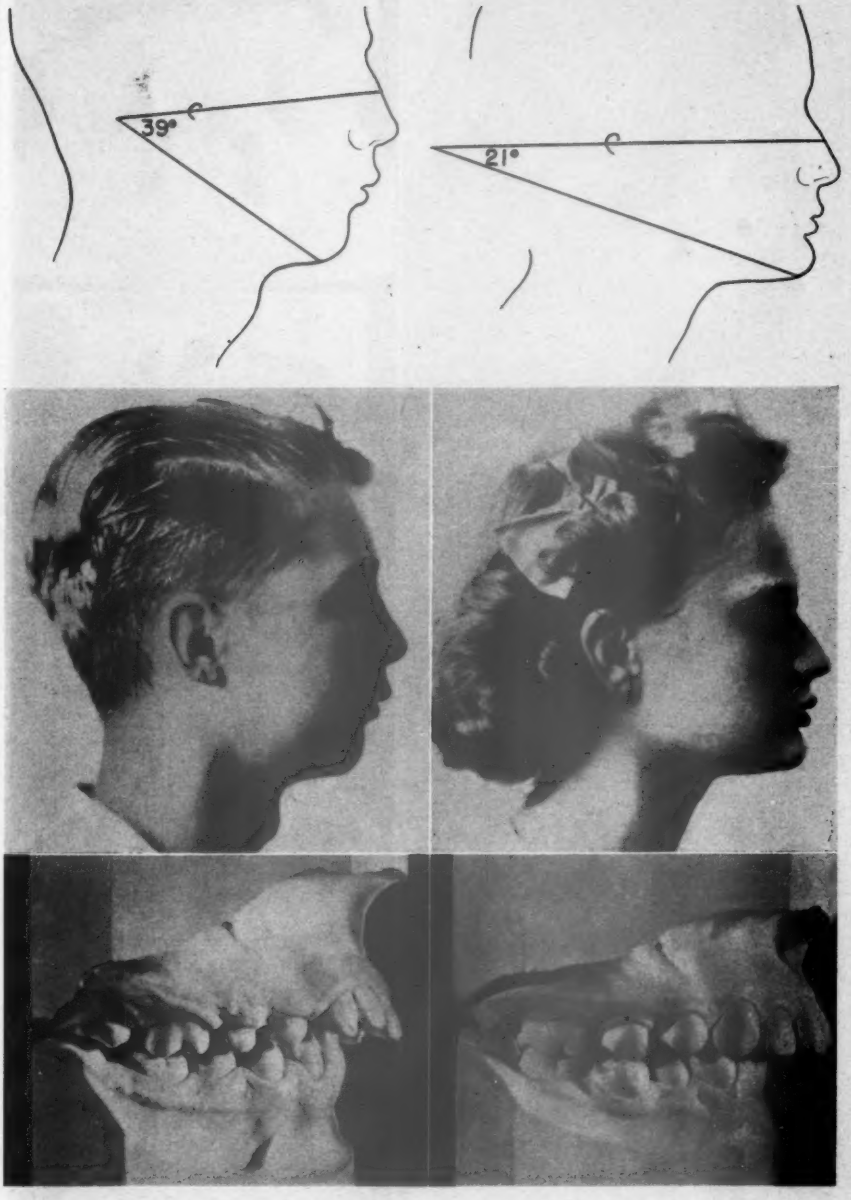

Fig. 3.—Two cases of Class II, Division 1, malocclusion. The models look similar, but the faces show definite differences in development. Drawings show angles formed by mandibular and Frankfort planes. Proper treatment will greatly enhance balance of facial lines for the girl; less favorable results in regard to facial balance are anticipated for the boy

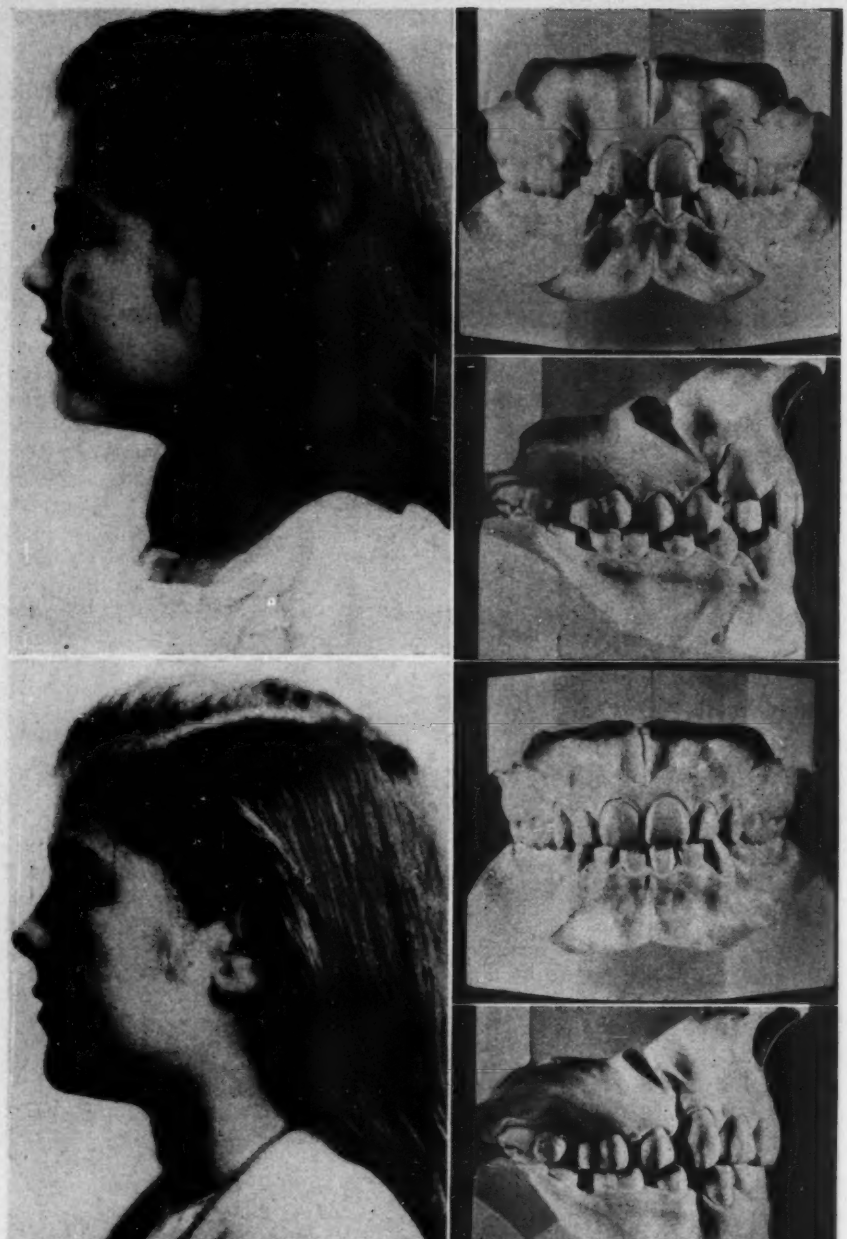

Fig. 4.—Advanced Class I malocclusion. Upper portrait and casts were made before treatment; lower ones after treatment. As facial development and balance were highly satisfactory, the teeth were repositioned without disturbing the appearance of the face

sciously or unconsciously, one surely will take into consideration the facial balance of the patient, and this will influence the opinion of the result. In other words, the arrangement of the teeth and their surrounding structures is so closely related to the pattern of the face that it is impossible to analyze the case without considering all of these. Attainment of a better alignment of teeth in the treated patient cannot be considered adequate if the facial balance has been ignored completely so that the patient presents a facial picture which is worse than when treatment was started. Achieving this result is no more permissible than presenting the patient with a nicely balanced face but with all four cuspids pushed buccally out of the line of the arch to attain this balance. It would be safe to say that no one ever thought of doing the latter, yet certainly too many of us have pushed the face into unnatural shapes for the sake of placing a full complement of teeth in alignment within the oral cavity.

Malocclusion Without Unbalance

This brings up another phase in the discussions which have taken place about certain of these procedures. It has been said that no change could be noted in facial photographs taken of certain patients before and after treatment during which teeth were removed. In reply to this it may be asked whether it is necessary that any change be effected in the face during treatment. If it could be agreed that changes which would tend to create unbalance in the face were not permissible, the face would be analyzed carefully before treatment to see whether it was necessary to cause any change whatever. Surely not all persons with orthodontic problems present a distorted face. Here again is a valid reason for good photographs, a study of which would reveal whether improvement of facial lines should be attempted or whether everything possible should be done to prevent disturbance of facial balance during treatment (Fig. 4).

Determining Developmental Level

Tweed[12, 13] and Broadbent[6, 7] have given us ways of determining the level at which facial development has arrived. Tweed's method of determining the Frankfort mandibular angle is purely clinical. Broadbent makes use of a Bolton-mandibular angle as well as a Frankfort-mandibular angle, both of which must be read from lateral roentgenograms of the head. They agree that when mandibular development shows a favorable downward and forward growth trend; that is, when the Frankfort-mandibular angle is approximately 16 degrees or the Bolton-mandibular angle is approximately 45 degrees, the face offers its maximum potentialities and everything points to a successful result if correct mechanical procedures are followed (Fig 5, above). As these angles become greater; for example, as the Frankfort-mandibular angle approaches 38 degrees, the chances of a good result become increasingly less until the point is reached where it is doubtful whether any good for the face can come from efforts to treat the patient mechanically (Fig. 5, below).

Although it is impossible to say definitely to what extremes these angles may go, clinical observations have shown that in most patients the Frankfort-mandibular angle will be somewhere between 16 and 38 degrees.

In short, if the basic structures of a good face are present and if the base

12. Tweed, C. H., The Frankfort-Mandibular Plane Angle in Orthodontic Diagnos's, Classification, Treatment Planning, and Prognosis. *Am. J. Orthodont. & Oral Surg.* 32:175 (April) 1946.

13. Tweed, C. H., A Philosophy of Orthodontic Treatment. *Am. J. Orthodont. & Oral Surg.* 31:74 (February) 1945.

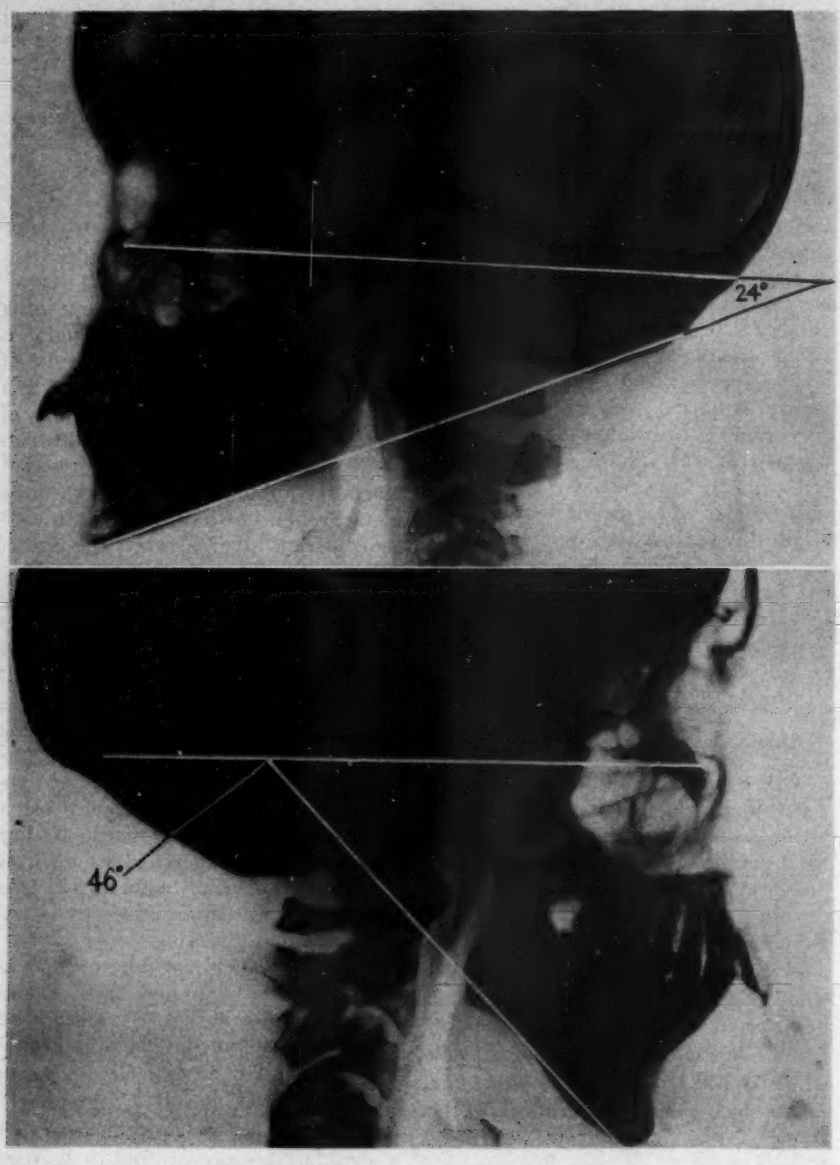

Fig. 5.—Lateral roentgenograms of heads of 2 patients. Above: The upper line (Frankfort plane) and lower line (mandibular plane) form an angle of 24 degrees. Although the patient has protruding teeth and marked Class II malocclusion, facial development is excellent and correct treatment procedures should effect good results. Below: The Frankfort-mandibular angle is 46 degrees Orthodontic treatment will be of doubtful value, and prognosis is extremely poor (Thompson)

Fig. 6.—Left: Good facial development, but poor balance of facial lines caused by malocclusion. Right: After orthodontic treatment. Proper positioning of teeth has greatly improved facial balance

bones of the jaws have reached good developmental levels, few dentists would desire to throw the appearance of the face into unbalance, regardless of convictions as to methods of treatment. Further, it would be undesirable to leave the face in unbalance if study of the patient revealed that the face could be improved.

Granted that there is such a thing as type, there is no justification for creating an orthodontic type by protruding teeth which in turn protrude lips, in an endeavor to create alignment of the full complement of teeth (Fig. 4). Also, there is justification for improving on type if the case has possibilities which will allow this to be accomplished (Fig. 6).

Summary

This article is a plea to those who are undertaking the orthodontic correction of dental deformities to give close consideration to the face. This will necessitate a fairly comprehensive knowledge of the way in which it grows and develops and an understanding of what is considered a good developmental level. Consideration of the face as a factor in diagnosis requires that the orthodontist not only understand the basic fundamentals of growth and development but also be able to apply them in such a way as to be reasonably sure of fulfilling his obligation in regard to facial balance.—*315 Alameda Road.*

Erythroblastosis.—An apparent increase in the incidence of erythroblastosis, a combination of jaundice and anemia due to blood incompatibility which kills about 50 per cent of the infants born with it, is probably due to transfusions of Rh-positive blood given to Rh-negative women. —*American Medical Association News.*

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LON W. MORREY, D.D.S., *Editor*

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EDITORIALS

NATIONAL HEALTH ASSEMBLY PROPOSES DENTAL HEALTH GOALS FOR NEXT DECADE

THE Dental Section of the National Health Assembly, which was convened in Washington in May at the call of the Federal Security Administrator, has outlined, in its preliminary report,[1] the progress that can be made in dental health in the next decade. This progress, the report makes clear, depends upon an intelligent appraisal of the basic problems and on the systematic application of the best methods available for controlling dental diseases.

The report properly states that "the most logical and effective means of ultimately bringing better dental health to the American people is adequate dental service for children," but that it must be recognized that "the solution of the dental health problem in this country also involves the prevention and control of dental diseases among adults." Such a program can be brought more fully to achievement if based on the five major dental health goals which the section proposed:

1. Prevention of dental disease through the application of effective preventive technics;
2. Control of dental diseases by making dental treatment and dental health education available to every child as rapidly as resources will permit;
3. Increased facilities for dental care in all hospitals and health centers;
4. Improved distribution of dentists between urban and rural areas and an increase in the number of qualified dental practitioners in the nation;
5. Training and utilization of additional auxiliary personnel—dental hygienists, dental assistants and dental technicians.

In order to achieve these goals, the Dental Section made specific recommendations in the fields of dental research, dental health education, dental health services, financing dental health care and dental personnel. All of these recommendations should have the full consideration of those individuals and agencies which bear the responsibility for the dental health of this country.

The report of the Dental Section points out very definitely that there are large areas of agreement on both the philosophy and method of improving dental health. These areas of agreement should not be made unproductive by flooding them with petty controversy which only further research and experience can resolve. Nor should disagreement on minor points prevent the implementation of the larger program on which there is major agreement. The deliberations of the National Health Assembly also clearly indicate that the elements of total health should not be segregated as individual problems to be mastered by the divided forces of society. Total health must be the objective of all programs and in these dentistry must have a restricted, but highly essential, part.

The report of the Dental Section may well be used as a basis for the planning of future dental health programs. It represents the considered opinion of private practitioner, dental teacher, researcher and administrator. It provides a sound foundation which can be employed to erect a better structure of dental health for the next generation of Americans.

1. Second National Health Assembly held in Washington, D.C., May 1 to 4. *J.A.D.A.* 36:507 (June) 1948.

HOUSE OF DELEGATES TO CONSIDER COMPLETE REVISION OF ASSOCIATION BYLAWS

THE complete text of the revised articles of the Constitution and Bylaws of the American Dental Association is presented in this issue. These articles will be presented to the House of Delegates for final consideration at the next annual session in September in Chicago.

For some years there has been general agreement that the bylaws of the Association were outmoded and quite inadequate to cope with problems that continually occur in an organization devoted to the public welfare and to the interests of more than seventy thousand members. The tempo of the times is such that frequently rapid and forthright action must be taken on an issue of the day. This requires the establishment of a clear line of authority which ends with the House of Delegates, which has the final voice in the establishment of policy for the Association. A careful reading of the new document will show that while alterations in administrative procedure have been made, the traditional rights and prerogatives of the House of Delegates have been zealously safeguarded.

The revised bylaws have been under study for more than two years by the Board of Trustees and the Committee on Constitution and Bylaws, of which Dr. Percy T. Phillips is chairman. Open hearings have been held in order to solicit and debate differing viewpoints. The document has been considered by many constituent and component societies and attention has been given to their suggestions. A final opportunity for full discussion will be provided at the next meeting of the House of Delegates. Every member of that assembly owes it to his constituents to be familiar with the revised instrument so as to procure the best possible basic laws for the Association.

DENTAL RESEARCH BILL PASSED BY BOTH BRANCHES OF CONGRESS

On June 14, Congress, after eight years of deliberation, passed a dental research bill (H.R. 6726). Congressman W. E. Brehm of Ohio, a member of the dental profession and the author of the bill, is largely responsible for the passage.

H.R. 6726 provides the United States Public Health Service with $2,000,000 for the construction and equipment of a dental research institute and $750,000 annually for research purposes.

The history of dentistry's efforts to interest the federal government in dental research dates back to 1940 when the American Dental Association sponsored the first dental research bill, introduced by Senator Murray of Montana. That bill, like several others that succeeded it, passed the Senate but failed to secure approval in the House of Representatives. Rebuffs received in each session of Congress served to stimulate the Committee on Legislation to increase its efforts on behalf of dental research. Now, after eight years of almost continuous labor, the efforts of the committee have been rewarded and the United States Public Health Service will be provided with funds to attack dental disease.

In recent years the Public Health Service, even with limited funds and personnel, has made many significant contributions to dental knowledge. If past interest and achievement are any indication of future accomplishments the profession and the public may expect the Public Health Service to make rapid progress in the discovery of measures that will prevent dental caries and other diseases of the mouth.

The Committee on Legislation is to be congratulated on the successful termination of its fight for this legislation. Congressman Brehm is to be commended for steering the bill through Congress, and the Public Health Service is to be complimented on adding one more responsibility to the many which it has assumed in its efforts to improve public health.

BILL TO PROVIDE FREE DENTAL SERVICE FOR NAVAL DEPENDENTS IS IMPRACTICAL

A bill to provide free dental service to dependents of naval and Marine Corps personnel has been introduced into the House of Representatives by Congressman W. S. Cole of New York. Mr. Cole, no doubt, is motivated by the best intentions, but good intentions alone will not make an impractical bill practical. Under present conditions, and under conditions that are likely to prevail in the immediate future, the Cole bill (H.R. 5494) is decidedly impractical because the

Navy Dental Corps, with its limited personnel, is experiencing difficulty in adequately caring for the dental needs of enlisted men without attempting to furnish service to their dependents.

The Navy Dental Corps has been understaffed for some time. Its strength will be reduced further this summer when many of its younger officers who received their training under the V-12 program will have completed their service. The Navy, the Army and the Veterans Administration are competing for additional dental officers. All three agencies are experiencing difficulty in securing them, largely because of the over-all shortage of dentists; a shortage that was accentuated by the government's refusal to grant deferment to prospective dental students during the last years of the war.

The desirability of furnishing free dental service to the dependents of all naval and Marine Corps personnel is open to question. Many members of the service, from a financial point of view, are better able to furnish their families with private dental care than are many civilians. Should the Cole bill be considered seriously by the Committee on Armed Services of the House of Representatives, to which it has been referred, provisions should be made to limit free dental care in the United States to dependents of servicemen in the lower income brackets, who cannot provide their families with the services of a private dentist. Obviously, provisions should be made to render dental service to dependents who accompany Navy men to remote stations where it is difficult to secure private dental service.

The Committee on Legislation of the American Dental Association has registered disapproval of the Cole bill and is prepared to render a formal statement, should the bill go into committee hearings.

Constitution
of
The American Dental Association

Article I *Name*

The name of this organization shall be the American Dental Association, hereinafter referred to as "the Association" or "this Association."

Article II *Object*

The object of this Association shall be to improve the health of the public and to promote the art and science of dentistry.

Article III *Organization*

Section 10. ***Incorporation:*** This Association is a non-profit corporation organized under the laws of the State of Illinois. If this corporation shall be dissolved at any time, no part of its funds or property shall be distributed to, or among, its members but, after payment of all indebtedness of the corporation, its surplus funds and properties shall be used for dental education and dental research in such manner as the then governing body of the Association may determine.

Section 20. ***Central Office:*** The registered office of this Association shall be known as the Central Office and shall be located in the City of Chicago, County of Cook, State of Illinois.

Section 30. ***Branch Offices:*** Branch offices of this Association may be established in any city of the United States by a majority vote of the House of Delegates.

Section 40. ***Membership:*** The membership of this Association shall consist of dentists and other persons whose qualifications and classifications shall be as established in Chapter I of the Bylaws.

Section 50. ***Constituent Societies:*** Constituent societies of this Association shall be those dental societies or dental associations chartered as such in conformity with Chapter II of the Bylaws.

Section 60. ***Component Societies:*** Component societies of this Association shall be those dental societies or dental associations organized as such in conformity with Chapter III of the Bylaws of this Association and in conformity with the bylaws of their respective constituent societies.

Section 70. ***Trustee Districts:*** The constituent societies of this Association and the federal government dental corps shall be grouped into thirteen (13) trustee districts, as provided in Chapter IV of the Bylaws.

Article IV *Government*

Section 10. ***Legislative Body:*** The legislative and governing body of this Association shall be the House of Delegates, which may be referred to as "the House" or "this House," as provided in Chapter V of the Bylaws.

Section 20. ***Administrative Body:*** This Association shall be administered by a Board of Trustees which may be referred to as "the Board" or "this Board," as provided in Chapter VI of the Bylaws.

Article V *Officers*

Section 10. ***Elective Officers:*** The elective officers of this Association shall be a President, a President-Elect, a First Vice-President, a Second Vice-President, a Third Vice-President and a Speaker of the House of Delegates, each of whom shall be elected by the House of Delegates as provided in Chapter XII of the Bylaws.

Section 20. ***Appointive Officers:*** The appointive officers of this Association shall be a Secretary, a Treasurer and an Editor, each of whom shall be appointed by the Board of Trustees as provided in Chapter VIII of the Bylaws.

Article VI *Sessions*

Section 10. ***Scientific Sessions:*** Scientific sessions of this Association shall be conducted by the members of the Association as provided in Chapter XIII of the Bylaws.

Section 20. ***Business Sessions:*** Business sessions of this Association shall be conducted by the members of the House of Delegates as provided in Chapter V of the Bylaws.

Article VII *Code of Ethics*

The Code of Ethics of this Association and the codes of ethics of the constituent and component societies which are not in conflict with the Code of Ethics of this Association, shall govern the professional conduct of all members.

Article VIII *Amendments*

This Constitution may be amended by a two-thirds (2/3) affirmative vote of the members of the House of Delegates, provided that the proposed amendments have been presented in writing at any previous session of the House of Delegates.

This Constitution also may be amended at any session of the House of Delegates by a unanimous vote, provided the proposed amendments have been presented in writing at a previous meeting of said session.

Bylaws of The American Dental Association

Chapter I *Membership*

Section 10. ***Classification:*** The members of this Association shall be classified as follows:

Active members
Life members
Affiliate members
Student members
Honorary members
Associate members

Section 20. ***Qualifications:***

A. ***Active Member.*** Any dentist licensed to practice in any one of the states, districts, territories or dependencies of the United States who is a member in good standing of this Association and a member in good standing of one of its constituent societies and a component thereof if such exists, or any dentist who is a member in good standing of this Association and who is licensed to practice in a territory or a dependency of the United States in which no constituent society has been chartered, or any dentist who is a member in good standing of this Association and who is a member of a federal government dental corps, shall be classified as an active member of this Association.

B. ***Life Member.*** A dentist who has been an active member of this Association in good standing for thirty-five (35) years, having attained the age of sixty-five (65) years, may be classified as a life member of this Association. Recommendations for life membership shall be made by the Board of Trustees and acted upon by the House of Delegates. A member who is elected a life member of this Association must pay dues and fees to his constituent or component society unless such dues or fees are waived.

C. ***Affiliate Member.*** An ethical dentist practicing in any country other than the United States who is a member of a recognized dental organization in such country may file with the Council on Membership of this Association an application for affiliate membership, which shall be referred with the Council's recommendation to the House of Delegates for action. If elected, on payment of dues as provided in Chapter XV of these By-Laws, he shall be classified as an affiliate member of this Association.

D. ***Student Member.*** Any undergraduate of a dental school accredited by this Association, who has been recommended by the dean of such dental school or by his appointed representative, or any graduate who, immediately after graduation, takes up an internship, residency or graduate work, on the payment of dues as provided in Chapter XV of these Bylaws, shall be classified as a student member of this Association. In order to become an active member of this

Association, a student member must make application to a constituent or component society.

E. ***Honorary Member.*** Any individual who has contributed materially to the advancement of the art and science of dentistry and who has been elected by the House of Delegates on the nomination of the Board of Trustees, shall be classified as an honorary member of this Association.

F. ***Associate Member.*** Any member of an allied profession who contributes to the advancement of dentistry may be classified as an associate member. Recommendations for associate membership shall be made by the Board of Trustees and acted upon by the House of Delegates.

Section 30. *In Good Standing:* Any member of this Association who is not under final sentence of suspension or expulsion and whose dues for the current calendar year have been paid shall be considered a member in good standing.

Any member of this Association receiving assistance from the relief fund of this Association shall be exempt from the payment of dues and shall be considered in good standing.

Section 40. *Privileges:*

A. ***Active Member.*** a. An active member in good standing shall receive annually a certificate of membership and *The Journal of the American Dental Association,* the subscription price of which shall be included in the annual dues. He shall be entitled also to admission to any scientific session of this Association and to such other services as are provided by the Association.

b. An active member in good standing shall be eligible for election as a delegate or alternate delegate to the House of Delegates and for election or appointment to any office, committee, council, board or similar position in the Association.

B. ***Life Member.*** A life member in good standing shall receive a certificate of life membership. He shall be entitled to all the privileges of an active member except that he shall not receive *The Journal of the American Dental Association* unless by subscription.

C. ***Affiliate Member.*** An affiliate member in good standing shall receive annually a certificate of affiliate membership and *The Journal of the American Dental Association,* the subscription price of which shall be included in the annual dues. He shall be entitled also to admission to any scientific session of this Association and to such other services as are provided by the Association.

D. ***Student Member.*** A student member in good standing shall receive annually a membership certificate and *The Journal of the American Dental Association,* the subscription price of which shall be included in the annual dues. He shall also be entitled to admission to any scientific session of this Association.

E. ***Honorary Member.*** An honorary member shall receive a certificate of honorary membership and *The Journal of the American Dental Association.* He shall be entitled also to admission to any scientific session of this Association and to such other services as are provided by the Association.

F. ***Associate Member.*** An associate member in good standing shall receive annually a certificate of associate membership and *The Journal of the American Dental Association,* the subscription price of which shall be included in the annual dues. He shall be entitled also to admission to any scientific session of this Association and to such other services as are provided by the Association.

G. ***Right of Hearing.*** Any member who is charged (1) with having been found guilty of a felony, (2) with having been found guilty of violating the dental practice act of a state, district, territory, dependency or country or (3) with violating these Bylaws, the Code of Ethics of this Association, the codes of ethics of the constituent or component societies, shall have the right of a hearing from the society preferring charges.

H. ***Right of Appeal.*** An accused member shall have the right to appeal from a decision of his component society to the constituent society by filing an appeal in affidavit form with the secretary of the constituent society. An accused member, or the component society concerned, shall have the right to appeal from a decision of a constituent society to the Judicial Council of this Association by filing an appeal in affidavit form with the

chairman of the Judicial Council. An accused member, the constituent society concerned or the component society concerned shall have the right to appeal from a decision of the Judicial Council of this Association to the House of Delegates by filing an appeal in affidavit form with the Secretary of the House of Delegates.

An appeal from any decision shall not be valid unless filed within thirty (30) days after such decision has been rendered. No decision shall become final while an appeal therefrom is pending.

Chapter II *Constituent Societies*

Section 10. ***Organization:*** A constituent society may be organized and chartered, subject to the approval of the House of Delegates, upon the application of at least twenty-five (25) dentists practicing in any state, district, territory, dependency or federal government dental corps of the United States, who are active or life members, in good standing, of this Association. No such society shall be chartered in any state, district, territory, dependency or federal government dental corps of the United States in which a constituent society is already chartered by this Association.

Section 20. ***Name:*** A constituent dental society shall take its name from the state, district, territory, dependency or federal government dental corps within which it is chartered.

Section 30. ***Powers and Duties:***

A. A constituent society shall have the power to elect its members and to elect its fully-privileged members as active members of this Association within the limits imposed by Section 40 of this Chapter.

B. It shall have the power to organize its members into component societies within the limits imposed by Chapter III, Section 10, of these Bylaws.

C. It shall have the power to provide for its financial support and to make laws, rules and regulations to govern its members provided such laws, rules and regulations do not conflict with these Bylaws.

D. It shall have the power to discipline any of its members by censure, probation, suspension or expulsion for having been found guilty of a felony, for having been found guilty of violating the dental practice act of the state, district, territory or dependency in which he practices, for violating these Bylaws, the Code of Ethics of this Association or the code of ethics adopted by the constituent or component society of which he is a member, subject to provisions in Chapter I, Section 40, G and H, of these Bylaws.

E. It shall be its duty to collect membership dues for this Association in conformity with Chapter XV, Section 10, of these Bylaws.

Section 40. ***Membership:*** The fully privileged membership of each constituent society shall be limited to dentists practicing within the territorial jurisdiction of such constituent society or to dentists in a federal government dental corps, provided that such dentists are in good standing in a component society thereof, if such exists, and provided that they are active or life members in good standing of this Association.

Explanatory Note: Any dentist who has retired from active practice or who is engaged in activities furthering the object of this Association may be considered to be practicing dentistry within the meaning of this section.

Section 50. ***Officers:*** The officers of a constituent society shall be president, secretary, treasurer and such others as may be prescribed in its constitution and bylaws.

Section 60. ***Sessions:*** A constituent society shall hold a business session at least once each calendar year.

Section 70. ***Code of Ethics:*** The Code of Ethics of this Association and the code of ethics adopted by the constituent society shall be the code of ethics of that constituent society for governing the professional conduct of its members.

Section 80. ***Constitution and Bylaws:*** Each constituent society shall adopt and maintain a constitution and bylaws, which shall not be in conflict with the Constitution and Bylaws of this Association and shall file a copy thereof and any changes which may be made thereafter, with the Secretary of this Association.

Section 90. ***Privilege of Representation:*** Each constituent society shall have the privilege of representation in the House of Delegates of this Association by one or more fully-privileged members of such society who are selected to serve as officially certified delegates according to the following formula: one (1) delegate for twenty-five (25) through ninety-nine (99) members classified as active or life members of this Association, one (1) additional delegate for the next two hundred (200) such members or fraction thereof; one (1) additional delegate for each additional two hundred (200) such members.

Each constituent society may select from among its fully-privileged members the same number of alternate delegates as delegates. An alternate delegate may act in the absence of a delegate at any meeting of the House of Delegates. Each constituent society shall have the privilege of determining the alternate delegate who shall be substituted for an absent delegate from that constituent society.

Section 100. ***Chartered Constituent Societies:*** The Secretary of the Association is authorized to issue a charter, in a form approved by the Board of Trustees, to each constituent society denoting its name and territorial jurisdiction. The following societies hereby are chartered as constituent societies of this Association:

Alabama Dental Association
Arizona State Dental Society
Arkansas State Dental Association
California State Dental Association
California State Dental Association, Southern
Colorado State Dental Association, The
Connecticut State Dental Association, The
Delaware State Dental Society
District of Columbia Dental Society, The
Florida State Dental Society
Georgia Dental Association
Hawaii Territorial Dental Society
Idaho State Dental Association
Illinois State Dental Society
Indiana State Dental Association
Iowa State Dental Society
Kansas State Dental Association, The
Kentucky State Dental Association
Louisiana State Dental Society, The
Maine Dental Society
Maryland State Dental Association
Massachusetts Dental Society
Michigan State Dental Society
Minnesota State Dental Association
Mississippi Dental Association, The

Missouri State Dental Association, The
Montana State Dental Association, Inc.
Nebraska State Dental Association
Nevada State Dental Association
New Hampshire Dental Society
New Jersey State Dental Society, The
New Mexico State Dental Society
New York, The Dental Society of the State of
North Carolina Dental Society, The
North Dakota State Dental Association
Ohio State Dental Association
Oklahoma State Dental Society
Oregon State Dental Association
Panama Canal Zone Dental Society
Pennsylvania State Dental Society, The
Puerto Rico, Colegio de Cirujanos Dentistas de
Rhode Island State Dental Society
South Carolina State Dental Association
South Dakota State Dental Society
Tennessee State Dental Association
Texas State Dental Society
Utah State Dental Association
Vermont State Dental Society
Virginia State Dental Association
Washington State Dental Association
West Virginia State Dental Society
Wisconsin State Dental Society
Wyoming State Dental Association

Chapter III *Component Societies*

Section 10. ***Organization:*** Component societies may be organized in conformity with a plan approved by the constituent society of which they shall be recognized entities provided, however, that the fully-privileged members of each component society shall consist of dentists who are members in good standing of their respective constituent societies and of this Association. Each component society shall adopt and maintain a constitution and Bylaws, which shall not be in conflict with the Constitution and Bylaws of this Association, and shall file a copy thereof and any changes which may be made thereafter with the Secretary of this Association.

Section 20. ***Powers and Duties:***

A. A component society shall have the power to elect its members and to elect its fully-privileged members as fully-privileged members of the constituent society, within the limits imposed by Chapter II, Section 40, of these Bylaws.

B. It shall have the power to make laws, rules and regulations, not in conflict with the Bylaws of this Association; to adopt a code of ethics, not in conflict with the Code of Ethics of this Association; to govern the professional conduct of its members; to provide for its financial support.

C. It shall have the power to discipline any of its members by censure, probation, suspension

or expulsion for having been found guilty of a felony; for having been found guilty of violating the dental practice act of a state, district, territory or dependency; for violating these Bylaws or the Code of Ethics of this Association subject to the provisions in Chapter I, Section 40, G and H, of these Bylaws.

D. It shall be its duty to collect membership dues for this Association in conformity with Chapter XV, Section 10, of these Bylaws.

Chapter IV *Trustee Districts*

Section 10. ***Organization:*** The constituent societies and the federal government dental corps shall be grouped into thirteen (13) trustee districts designated by the numbers 1 to 13 respectively, each of which shall be composed of approximately one-thirteenth (1/13) of the total number of active and life members of this Association insofar as this is practicable geographically.

Section 20. ***Purpose:*** The purpose of the trustee districts is to provide for the representation of the members of the constituent societies and the federal government dental corps on the Board of Trustees

Section 30. ***Composition:*** The trustee districts are numbered and composed as follows:

District 1
Connecticut State Dental Association, The
Maine Dental Society
Massachusetts Dental Society
New Hampshire Dental Society
Rhode Island State Dental Society
Vermont State Dental Society

District 2
New York, The Dental Society of the State of

District 3
Pennsylvania State Dental Society, The

District 4
Army Dental Corps
Delaware State Dental Society
District of Columbia Dental Society, The
Maryland State Dental Association
Naval Dental Corps
New Jersey State Dental Society, The
Public Health Service, U. S.
Puerto Rico, Colegio de Cirujanos Dentistas de
Veterans Administration

District 5
Alabama Dental Association
Florida State Dental Society
Georgia Dental Association
Mississippi Dental Association, The
North Carolina Dental Society, The
South Carolina State Dental Association
Virginia State Dental Association

District 6

Kentucky State Dental Association
Missouri State Dental Association, The
Tennessee State Dental Association
West Virginia State Dental Society

District 7

Indiana State Dental Association
Ohio State Dental Association

District 8

Illinois State Dental Society

District 9

Michigan State Dental Society
Wisconsin State Dental Society

District 10

Iowa State Dental Society
Minnesota State Dental Association

District 11

Idaho State Dental Association
Montana State Dental Association, Inc.
Nebraska State Dental Association
North Dakota State Dental Association
Oregon State Dental Association
South Dakota State Dental Society
Washington State Dental Association
Wyoming State Dental Association

District 12

Arkansas State Dental Association
Colorado State Dental Association, The
Kansas State Dental Association, The
Louisiana State Dental Society, The
New Mexico State Dental Society
Oklahoma State Dental Society
Texas State Dental Society

District 13

Arizona State Dental Society
California State Dental Association
California State Dental Association, Southern
Hawaii Territorial Dental Society
Nevada State Dental Association
Panama Canal Zone Dental Society
Utah State Dental Association

Chapter V *House of Delegates*

Section 10. ***Composition:*** The House of Delegates shall be composed of the officially certified delegates of each constituent society and one (1) officially certified delegate from each of the federal government dental corps which is not organized into a constituent society of this Association. The elective officers, the voting members of the Board of Trustees and the past-presidents of this Association shall be *ex officio* members of the House of Delegates

without the power to vote unless duly selected as delegates of their respective constituent societies or federal government dental corps.

Section 20. ***Certification of Delegates and Alternate Delegates:*** The secretary of each constituent society and the ranking administrative dental officer of each federal government dental corps shall file with the Secretary of this Association, at least sixty (60) days prior to the first day of the annual session of the House of Delegates, the names of delegates and alternate delegates duly selected by his society or corps. The Secretary of this Association shall provide each delegate and alternate delegate with proper credentials which shall be presented to the Committee on Credentials of the House of Delegates for registration and admission to the meetings of the session. In the event of a contest over the credentials of any delegate or alternate delegate, the Committee on Credentials shall hold a hearing and report its findings and recommendations to the House of Delegates for final action.

Section 30. ***Powers:***

A. The House of Delegates shall be the supreme authoritative body of this Association.
B. It shall possess the legislative powers of the Association.
C. It shall determine the policies which shall govern this Association in all of its activities.
D. It shall have the power to enact, amend and repeal the Constitution and Bylaws of the Association.
E. It shall have the power to adopt and amend the Code of Ethics for governing the professional conduct of the members of this Association.
F. It shall have the power to grant, amend or revoke charters of constituent societies.
G. It shall have the power to elect life, affiliate, honorary and associate members of the Association.
H. It shall have the power to create special committees of the Association.
I. It shall have the power to establish branch offices of the Association.
J. It shall have the power to approve all memorials, resolutions or opinions in the name of the American Dental Association.

Section 40. ***Duties:*** It shall be the duty of the House of Delegates:

A. To elect the elective officers.
B. To elect the members of the Board of Trustees.
C. To elect the members of the Association's councils and advisory committees.
D. To select the place for the annual session of the House of Delegates and the annual scientific session.
E. To adopt an annual budget.
F. To serve as the court of appeal from a decision of the Judicial Council on any disciplinary action taken against any member of this Association.

Section 50. ***Transfer of Powers and Duties of the House of Delegates:*** The powers and duties of the House of Delegates referred to in Sections 30 and 40 of this Chapter, except the power to amend, enact and repeal the Constitution and Bylaws of this Association and the duty of electing the elective officers and the members of the Board, may be transferred to, and assumed by, the Board of Trustees of this Association in time of extraordinary emergency. The existence of a time of extraordinary emergency shall be determined by mail vote of the last House of Delegates on recommendation of at least five (5) of the elective and appointive officers. A mail vote to be valid shall consist of not less than one-fourth (1/4) of the members of said House of Delegates. A majority of the votes cast within thirty (30) days after the posting of the ballot shall decide such vote.

Section 60. ***Annual Sessions:*** The House of Delegates shall convene annually. Whenever annual scientific sessions are to be held, such annual session of the House of Delegates

shall convene not less than one (1) day nor more than three (3) days, as determined by the Board of Trustees, preceding the opening of, and in the same city as, the annual scientific session of this Association. The House shall meet each day thereafter until adjournment *sine die*, except that recesses may be taken for not longer than a forty-eight (48) hour period.

Section 70. ***Special Sessions:*** A special session of the House of Delegates shall be called by the President to consider only such business as shall be mentioned in the call, on three-fourths (¾) affirmative vote of the members of the Board of Trustees present and voting in a regular or special session, or on written request of one-fifth (1/5) of the officially certified delegates who comprised the last House of Delegates provided, however, that such request shall be made by at least one (1) delegate each from not less than one-third (1/3) of the constituent societies. The time and place of any special session of the House shall be determined by the President provided, however, that the time selected shall be not more than forty-five (45) days after the date the vote was taken or the request received.

Section 80. ***Official Call:***

A. ***Annual Sessions.*** The Secretary of the Association shall cause to be published in *The Journal of the American Dental Association* an official notice of the time and place of each annual session, and he shall send each delegate and alternate delegate a copy of such notice, together with his official credentials, as soon as practicable after each such delegate and alternate delegate has been officially certified, but not less than thirty (30) days before the opening of such session.

B. ***Special Sessions.*** The Secretary of the Association shall send an official written notice of the time and place of each special session and a statement of the business to be considered to every officially certified delegate and alternate delegate of the last House, not less than twenty (20) days before the opening of any such session.

Section 90. ***Quorum:*** One-fourth (1/4) of the voting members of the House of Delegates shall constitute a quorum for the transaction of business at any meeting of any session.

Section 100. ***Officers:***

A. ***Number and Title.*** The officers of the House shall be a chairman and a secretary. The Speaker of the House of Delegates shall be the chairman, and the Secretary of this Association shall be the secretary.

In the absence of the speaker, the office of chairman shall be filled by the President. In the absence of the Secretary, the chairman shall appoint a secretary *pro tem*.

B. ***Duties:***

a. ***Chairman.*** The Chairman shall preside at all meetings of the House of Delegates, cast the deciding vote in case of a tie, appoint judges and tellers to assist him in determining the result of any action taken by ballot and perform such other duties as custom and parliamentary usage require.

He may consult a professional parliamentarian when a question of order arises. The decision of the Chairman shall be final unless an appeal from such decision shall be made by a member of the House, in which case final decision shall be by a majority vote.

b. ***Secretary.*** The Secretary shall serve as the recording officer of the House and the custodian of its records. He shall utilize the services of a professional recorder for the purpose of obtaining a stenographic record of the proceedings of the House and shall cause a factual record of the proceedings to be edited and published as the official transactions of the House. He shall serve as the reading clerk of the House but may designate an assistant to perform this duty.

Section 110. ***Order of Business, Annual Sessions:*** Unless changed by a two-thirds (2/3) affirmative vote, the order of business for meetings of any annual session shall be as follows:

A. ***First Day:***
- a. Meeting called to order by the chairman
- b. Report of Committee on Credentials
- c. Reading of minutes of previous meeting
- d. Reports of officers
- e. Report of the Board of Trustees, including presentation of nominations
- f. Reports of councils and committees
- g. Reports of reference committees
- h. Unfinished business
- i. New business
- j. Adjournment

B. ***Second Day:***
- a. Meeting called to order by chairman
- b. Report of Committee on Credentials
- c. Reading of minutes of previous meeting
- d. Report of Board of Trustees, including presentation of budget
- e. Report of councils and committees
- f. Reports of reference committees
- g. Unfinished business
- h. Nomination of officers, trustees and members of councils and committees
- i. New business
- j. Adjournment

C. ***Last Day:***
- a. Meeting called to order by chairman
- b. Report of Committee of Credentials
- c. Reading of minutes of previous meeting
- d. Report of Board of Trustees
- e. Report of reference committees
- f. Unfinished business
- g. Announcement of election of officers, etc.
- h. Installation of officers
- i. Adjournment

Section 120. ***Order of Business, Special Sessions:*** The order of business for any special session of the House of Delegates shall be:
- Meeting called to order by the chairman
- Report of Committee on Credentials
- Reading of the call for special meeting
- Transaction of business as provided in the call
- Adjournment

Section 130. ***Rules of Order:***

A. ***Standing Rules.***

a. ***Reports.*** All reports, except supplemental reports, of elective officers, Board of Trustees, councils and committees shall be published under the direction of the Secretary of the Association and sent to each delegate and alternate delegate at least fourteen (14) days in advance of the opening of the annual session. All supplemental reports of any such officers or agencies shall be distributed if possible to each delegate before such report is considered by the House.

b. ***Recommendations or Resolutions on Appropriation of Funds.*** Any recommendation or resolution, except the annual budget, presented in the House proposing an

appropriation of funds of this Association shall be referred to the Board of Trustees for consideration and report, at the same or at a later meeting of the House, relative to the availability of such funds for the purpose specified.

c. ***Consideration of Budget.*** The annual budget shall be submitted to the House of Delegates as soon as possible, but in all instances it shall be presented at a meeting prior to the last meeting of each session. In the event the budget as submitted is not approved by the House, all recommendations concerning changes shall be referred to the Board of Trustees for the preparation of a revised budget, which revised budget shall be submitted to the House as soon thereafter as possible. This procedure shall be repeated until a budget for the ensuing fiscal year shall be adopted.

d. ***Introduction of New Business at Last Meeting.*** No new business shall be introduced into the House of Delegates at the last meeting of an annual session unless by unanimous consent of the delegates. Action on any such new business shall require unanimous vote for adoption.

B. ***Additional Rules.*** The rules contained in "Robert's Rules of Order, Revised," shall govern the deliberations of the House in all cases in which they are applicable and not in conflict with the standing rules or these Bylaws.

Section 140. ***Committees:*** The committees of the House shall be:

A. ***Committee on Credentials.***

a. ***Personnel.*** A Committee on Credentials, consisting of three (3) officially certified delegates, shall be appointed by the President at least twenty (20) days in advance of each session.

b. ***Duties.*** It shall be the duty of the Committee on Credentials:

(1) To determine and record the roll of the House at each meeting and to report at the time provided in the order of business.

(2) To conduct a hearing on any contest which may arise over the certification of a delegate or alternate delegate and to report its recommendations to the House.

B. ***Reference Committees.***

a. ***Personnel.*** Reference committees consisting of three (3) members each shall be appointed by the President at least twenty (20) days in advance of each session.

b. ***Duties.*** It shall be the duty of a reference committee to consider reports referred to it, to conduct open hearings and to report its recommendations to the House of Delegates.

C. ***Special Committees.*** Special committees of the House may be appointed by the chairman, who shall appoint such committees on direction of the House to serve until adjournment *sine die* of the session at which they were appointed, for the purpos of performing any duty not otherwise assigned by these Bylaws to a committee of the House.

Chapter VI *Board of Trustees*

Section 10. ***Composition:*** The Board of Trustees shall consist of one (1) trustee from each of the thirteen (13) trustee districts. Such thirteen (13) trustees shall constitute the voting membership of the Board. In addition, the elective and appointive officers of the Association except as otherwise provided in these Bylaws shall be *ex officio* members without the right to vote.

Section 20. ***Qualifications:*** A trustee must be an active or life member, in good standing, of this Association and a fully-privileged member of one of the constituent societies which compose the trustee district he is elected to represent. Shou'd the status of any trustee change

in regard to the preceding qualifications during his term of office, that office shall be declared vacant and the President shall proceed to fill such vacancy as provided in Chapter VI, Section 70, of these Bylaws.

Section 30. ***Term of Office:*** The Trustees shall be divided into three groups of four (4), four (4) and five (5) respectively, each group to serve for a period of three (3) years. One group shall be elected annually.

Section 40. ***Nomination:*** At each annual session of the House of Delegates, the delegates from the constituent societies in each trustee district in which the term of office of the trustee is about to expire shall hold a caucus for the purpose of selecting a nominee or nominees for the office of trustee. Such caucus, in each case, shall be called by the trustee whose term is about to expire, or by some delegate from the district appointed by the President of the Association if such trustee is absent. The notice of the time and place of such caucus shall be reported to the secretary of the House who shall announce same to the House at a convenient time.

At such caucus, the delegates shall nominate one (1) or more candidates for the office of trustee, whose name or names shall be presented to the House at the proper time. Such nominations shall be made on the morning of the second day in accordance with the following rules:

A. A person receiving the unanimous vote of the delegates present and voting shall be the only nominee of the district, and the name of such nominee shall be presented to the House as the only nominee of that district.

In the event that one (1) candidate receives a majority vote, one (1) or more of the delegates voting in the minority may select other nominees and the names of such nominees shall be presented to the House as the nominees of that district.

In all cases, the number of votes received by each nominee in the caucus shall be reported to the House.

B. A nominating speech of two minutes shall be allowed in the House in behalf of each nominee. Seconding speeches for any nominees shall be limited to one (1) minute in length and two (2) in number.

Section 50. ***Election:*** The trustee shall be elected by the House according to the following rules:

A. If there is only one (1) nominee from a trustee district, the chairman shall declare such nominee elected.

B. If there is more than one (1) nominee from a trustee district, the election shall be by ballot in accordance with Chapter XII, Section 10. The person receiving the largest number of votes cast shall be declared elected.

Section 60. ***Installation:*** The trustees shall be installed by the President or someone delegated by him at the time scheduled in the order of business.

Section 70. ***Vacancy:*** In the event of a vacancy in the office of a trustee, the President shall appoint a qualified member of the constituent society in the trustee district in which the vacancy occurs to fill such office until a successor is elected by the next House of Delegates for the remainder of the unexpired term.

Section 80. ***Powers:***

A. The Board shall be the managing body of the Association, vested with full power to conduct all business of the Association, subject to the laws of the State of Illinois, the Articles of Incorporation, the Constitution and Bylaws and the mandates of the House of Delegates.

B. It shall have the power to establish rules and regulations not inconsistent with these

Bylaws to govern its organization, procedure and conduct.
C. It shall have the power to direct the President to call a special session of the House of Delegates as provided in Chapter V, Section 70, of the Bylaws.
D. It shall have the power to nominate to the House of Delegates candidates for honorary membership or for the honorary award of this Association.
E. It shall have full discretionary power to cause to be published in, or to be omitted from, any official publication of the Association any article in whole or in part, except the editorials written or approved by the Editor.
It shall have the power to establish ad interim policies when the House of Delegates is not in session and when such policies are essential to the management of the Association, provided, however, that all such policies must be presented for review at the next session of the House of Delegates.

Section 90. ***Duties.*** It shall be the duty of the Board of Trustees:

A. To provide for the maintenance and supervision of the Central Office and all other property or offices owned or operated by this Association.
B. To appoint qualified members of the Association to the offices of Secretary, Treasurer and Editor, respectively.
C. To determine the time for convening each annual session of the House of Delegates within the limits set forth in Chapter V, Section 60, of these Bylaws.
D. To cause to be bonded by a reliable surety company any appointive officer or employee of the Association entrusted with Association funds for whatever amount deemed necessary.
E. To cause to be audited by a reputable auditor all accounts of the Association at least semiannually.
F. To prepare a budget for carrying on the activities of the Association for each ensuing fiscal year.
G. To provide for the publication and distribution of all official publications of the Association.
H. To cause to be distributed to the secretary of each constituent society and component thereof all approved plans for increasing the principal of the Relief Fund of this Association and to promulgate the rules and regulations for the granting of financial aid to dentists, their dependents and survivors.
I. To submit to the House of Delegates at the opening meeting, nominations in printed form for membership in the various councils and advisory committees of this Association, except as otherwise provided in these Bylaws.
J. To appoint annually the chairman of each council and advisory committee of the Association.
K. To review the annual written reports of all councils and special committees of the Association and to make recommendations concerning same to the appropriate reference committee of the House of Delegates.
L. To cause to be promulgated in *The Journal of the American Dental Association* all policies of the Association adopted by the House of Delegates.
M. To act on applications for membership received from the Council on Membership.
N. To submit an annual report to the House of Delegates concerning its activities and those of the appointive officers of the Association.
O. To recommend to the House of Delegates suitable places for annual sessions.
P. To recommend to the House of Delegates nominees for life and associate memberships.
Q. To perform such other duties as are prescribed by these Bylaws.

Section 100. ***Sessions:***

A. ***Regular Sessions.*** There shall be three regular sessions of the Board each year:
a. Immediately after the close of each annual session of the House of Delegates.
b. During the months of January, February or March, as may be determined by the Board.

c. Immediately before and during each annual session of the House of Delegates. This session shall continue until adjournment *sine die* of the House but may be recessed from time to time.

B. ***Special Sessions.*** Special sessions of the Board may be called at any time by the President. He shall call such sessions on request of five (5) members of the Board, provided that due notice of any such session is given to each member of the Board at least ten (10) days in advance of the time scheduled for holding such session. No other business shall be considered except that provided in the call unless unanimous consent is obtained from the members present and voting.

Section 110. ***Quorum:*** A majority of the voting members of the Board of Trustees shall constitute a quorum for the transaction of business at any session.

Section 120. ***Officers:***

A. ***Number and Title.*** The officers of the Board of Trustees shall be a chairman and a secretary. The President of this Association shall be the chairman, and the Secretary of this Association shall be the secretary.

In the absence of the President, the office of chairman shall be filled by one of the Vice-Presidents, and in the event of the absence of all of the Vice-Presidents, a voting member of the Board shall be elected to serve as chairman *pro tem.*

In the absence of the Secretary, the chairman shall appoint a secretary *pro tem.*

B. ***Duties.***

a. ***Chairman.*** The chairman shall preside at all meetings of the Board, cast the deciding vote in the case of a tie and perform such other duties as custom and parliamentary usage require.

He may utilize the counsel and advice of a professional parliamentarian when a question of order arises provided, however, that the decision of the chairman shall be final unless an appeal from such decision is made by a member of the Board, in which case final decision shall be by a majority vote of the trustees present and voting.

b. ***Secretary.*** The secretary shall serve as the recording officer of the Board and as the custodian of its records. He shall utilize the services of a professional recorder for the purpose of obtaining a stenographic record of the proceedings of the Board and shall cause a factual record of such proceedings to be edited and published as the official transactions of the Board. He shall serve as the reading clerk of the Board but may designate an assistant to perform this duty.

Chapter VII *Elective Officers*

Section 10. ***Number and Title:*** The elective officers of this Association shall be six (6) in number: President, President-Elect, First Vice-President, Second Vice-President, Third Vice-President and Speaker of the House of Delegates, as provided in Article V of the Constitution.

Section 20. ***Eligibility:*** Only an active or life member, in good standing, of this Association shall be eligible to serve as an elective officer.

Section 30. ***Nominations:*** At the first meeting of the second day of each annual session of the House of Delegates, as provided in Chapter V, Section 110, of the Bylaws, nominations for the offices of President-Elect, First Vice-President, Second Vice-President, Third Vice-President and Speaker of the House of Delegates shall be made. No nominating speech

shall exceed four (4) minutes in length. Seconding speeches for any nominee shall be limited to one (1) minute in length and two (2) in number.

Section 40. ***Elections:*** The elective officers shall be elected in accordance with Chapter XII, Section 10.

Section 50. ***Tenure of Office:*** The elective officers shall serve for a term of one (1) year or until their successors are elected and installed.

Section 60. ***Installation:*** The elective officers shall be installed at the last meeting of each annual session of the House as provided in Chapter V, Section 110, of the Bylaws. The President-Elect shall be installed as President at the next annual session of the House following that of his election.

Section 70. ***Vacancies:*** In the event the office of President becomes vacant, the First Vice-President shall become President for the unexpired portion of the term. In the event the office of First Vice-President becomes vacant, the Second Vice-President shall become the First Vice-President for the unexpired portion of the term. In the event the office of Second Vice-President becomes vacant, the Third Vice-President shall become the Second Vice-President for the unexpired portion of the term. A vacancy in the office of Third Vice-President or Speaker of the House of Delegates shall be filled by a majority vote of the Board of Trustees. In the event the office of President-Elect becomes vacant, the office of President for the ensuing year shall be filled at the next annual session of the House in the same manner as that provided for the nomination and election of elective officers, except that the ballot shall read "President for the Ensuing Year."

Section 80. ***Duties:*** The duties of the elective officers shall be:

A. ***President.*** It shall be the duty of the President:

a. To serve as an official representative of this Association in its contacts with governmental, civic, business and professional organizations for the purpose of advancing the objects and policies of this Association.

b. To serve as chairman and *ex officio* member of the Board of Trustees, performing such duties as are provided in Chapters V and VI of these Bylaws.

c. To preside at the general meetings of the annual scientific session and to deliver an address at the opening general meeting of such sessions on such matters as he may deem important to the public and the dental profession.

d. To call special sessions of the House of Delegates and the Board of Trustees as provided in Chapters V and VI of these Bylaws.

e. To appoint the members of all committees of the House of Delegates unless otherwise provided for by these Bylaws.

f. To fill any vacancies in the office of trustee as provided in Chapter VI, Section 70, of these Bylaws.

g. To submit a written report of the activities of his office to the House of Delegates.

h. To perform such other duties as may be provided in these Bylaws.

B. ***President-Elect.*** It shall be the duty of the President-Elect:

a. To assist the President as requested.

b. To serve as an *ex officio* member of the House of Delegates, unless he is serving as an officially certified delegate.

c. To serve as an *ex officio* member of the Board of Trustees.

d. To succeed to the office of President without other election at the next annual session of the House of Delegates after that at which he was elected to the office of President-Elect.

C. ***Vice-Presidents.*** It shall be the duty of the Vice-Presidents:

a. To assist the President as requested.

b. To serve as *ex officio* members of the House of Delegates unless they are serving as officially certified delegates.

c. To serve as *ex officio* members of the Board of Trustees.

d. To succeed to the office of President, First Vice-President or Second Vice-President in the event of vacancy in any such office as provided in this chapter of these Bylaws.

D. ***Speakers of the House of Delegates.*** The speaker shall preside at the meetings of the House of Delegates and shall perform such duties as custom and parliamentary usage require. He shall have the right to vote only when his vote shall be the deciding vote.

The Speaker shall not be a member of the Board of Trustees.

Chapter VIII *Appointive Officers*

Section 10. ***Number and Title:*** The appointive officers of this Association shall be three (3) in number: Secretary, Treasurer and Editor, as provided in Article V of the Constitution.

Section 20. ***Nominations and Appointments:*** Any voting member of the Board of Trustees may nominate any active or life member, in good standing, of this Association to any appointive office, and the Board shall appoint to such office the nominee receiving a majority vote of the Board.

Section 30. ***Tenure of Office and Salary:*** The Board of Trustees shall determine the tenure of office and salary of each appointive officer, but the term of any such officer shall not exceed three (3) years.

Section 40. ***Duties:*** The duties of the appointive officers shall be as follows:

A. ***Secretary.*** The Secretary shall be the executive head of the Central Office and all its branches. He shall engage all employees except as otherwise provided by these Bylaws. He shall supervise and coordinate the activities of all councils, committees and bureaus in regard to their specific assignments and systematize the preparation of all reports of such councils, committees and bureaus.

B. ***Treasurer.*** The Treasurer shall serve as custodian of all moneys, securities and deeds belonging to the Association which may come into his possession, and he shall hold, invest and disburse same, subject to the direction of the Board of Trustees, and perform such other duties as are prescribed by the Board of Trustees or these Bylaws.

C. ***Editor.*** The Editor shall be the Editor-in-Chief of all official or specialty journals of the Association and, as such, shall exercise full editorial control over such publications, subject only to policies and procedures established by the Board of Trustees or these Bylaws. He shall perform such other duties as are prescribed by the Board of Trustees or these Bylaws.

Chapter IX *Councils*

Section 10. ***Number and Name:*** The councils of this Association shall be eighteen (18) in number:

Council on Constitution and Bylaws

Council on Dental Education

Council on Dental Health
Council on Dental Museum and Registry
Council on Dental Research
Council on Dental Therapeutics
Council on Dental Trade and Laboratory Relations
Council on Federal Government Dental Corps
Council on History
Council on Insurance
Council on International Relations
Council on Journalism
Council on Legislation
Council on Membership
Council on Relief
Council on Scientific Session
Judicial Council
National Board of Dental Examiners

Section 20. *Members, Nominations and Elections.*

A. All councils, except as otherwise provided for in these Bylaws, shall be composed of five (5) members. Nominations for all councils shall be made by the Board of Trustees. Additional nominations may be made by the House of Delegates unless otherwise provided for in these ByLaws. They shall be elected by the House of Delegates in accordance with Chapter XII, Section 10.

B. ***Council on Dental Education.*** The Council on Dental Education shall be composed of nine (9) members, nominated and elected as follows:

a. ***Nomination.***

(1) Three (3) members shall be nominated by the Board of Trustees from the active or life members of this Association, no one of whom shall be a member of a faculty of a school of dentistry or a member of a state board of dental examiners

(2) Three (3) members shall be nominated by the American Association of Dental Examiners from the membership of that body, no one of whom shall be a member of a faculty of a school of dentistry.

(3) Three (3) members shall be nominated by the American Association of Dental Schools from its membership. These members shall hold positions of professorial rank in dental schools accredited by this Association and shall not be members of any state board of dental examiners.

b. ***Election.*** All members of the council shall be elected by the House of Delegates from nominees selected as provided in this section.

C. ***National Board of Dental Examiners.*** The National Board of Dental Examiners shall be composed of nine (9) members nominated and elected as follows:

a. ***Nomination.***

(1) Three (3) members shall be nominated by the Board of Trustees from the active or life members of this Association, no one of whom shall be a member of a faculty of a school of dentistry or a member of a state board of dental examiners.

(2) Three (3) members shall be nominated by the American Association of Dental Examiners from the membership of that body, no one of whom shall be a member of a faculty of a school of dentistry.

(3) Three (3) members shall be nominated by the American Association of Dental Schools from its membership. These members shall hold positions of professorial rank in dental schools accredited by this Association and shall not be members of any state board of dental examiners.

b. ***Election.*** All members of the National Board of Dental Examiners shall be elected by the House of Delegates from nominees selected as provided in this section.

Section 30. ***Consultants, Advisers and Additional Personnel:***

A. ***Consultants and Advisers.*** In addition to individual council membership as previously provided, each council shall have the authority to appoint or employ consultants, advisers and additional personnel in conformity with rules and regulations established by the Board of Trustees.

B. ***Secretaries.*** Secretaries of councils, in the event they are employees, shall be employed by the secretary of the Association from nominations submitted by the councils concerned.

Section 40. ***Chairmen:*** One member of each council shall be appointed annually by the Board of Trustees to serve as chairman. The chairman of the Council on Dental Education and of the National Board of Dental Examiners shall be appointed from nominations submitted by their respective bodies.

Section 50. ***Eligibility:***

A. All members of councils must be members in good standing of this Association at the time of their nomination and election and must maintain such membership during their term of office.

B. When a member of either the Council on Dental Education or the National Board of Dental Examiners shall cease to be a member of the organization which nominated him, his membership on either such council shall terminate, and the President of the Association shall declare such position vacant.

Section 60. ***Term of Office:*** The term of office for each member of all councils shall be three (3) years, and at the end of each term of office a successor shall be elected for a term of three (3) years. At the first election after the adoption of these Bylaws there shall be elected to the Council on Dental Education and to the National Board of Dental Examiners, from each of the three (3) classifications in such councils, one (1) member for one (1) year, one (1) member for two (2) years and one (1) member for three (3) years.

At the first election after the adoption of these Bylaws, there shall be elected to the Council on Dental Health, three (3) members for one (1) year, three (3) members for two (2) years, three (3) members for three (3) years.

At the first election after the adoption of these Bylaws, there shall be elected to all councils, except the Council on Dental Education, the Council on Dental Health and the National Board of Dental Examiners, one (1) member for one (1) year, two (2) members for two (2) years and two (2) members for three (3) years.

Section 70. ***Vacancy:*** In the event of a vacancy in the membership of any council, the President shall appoint a member of the Association possessing the same qualifications as to eligibility as the previous member, to fill such vacancy until a successor is elected by the next House of Delegates for the remainder of the unexpired term.

Section 80. ***Quorum:*** A majority of the total number of members of any council shall constitute a quorum for the transaction of business.

Section 90. ***Expenses:*** The Association shall pay the expenses of each council, provided that such expenses are incurred in conformity with rules and regulations established by the Board of Trustees, and provided further that the council budget as approved by the House of Delegates is sufficient to cover the payment of such expenses.

Section 100. ***Duties:***

A. ***Common Duties of All Councils.***

a. ***Proposed Budget.*** Each council shall submit in writing to the Board of Trustees

a proposed itemized budget of anticipated expenditures for the ensuing fiscal year. Such budget shall be submitted at least forty-five (45) days in advance of the final regular session of the Board of Trustees as scheduled in Chapter VI, Section 100, of these Bylaws.

b. ***Annual Report.*** Each council shall submit, through the Secretary's office, an annual written report to the House of Delegates and a copy thereof to the Board of Trustees.

B. ***The Council on Constitution and Bylaws.*** The Council on Constitution and Bylaws shall examine the articles of the Constitution and Bylaws with a view to suggesting changes that will advance the administrative efficiency of this Association. This Council shall consider all proposed amendments and report its recommendations to the House of Delegates and the Board of Trustees.

C. ***Council on Dental Education.*** The Council on Dental Education shall act as the agency of this Association in the investigation of dental education and associated subjects and make recommendations for means and methods of improving same to the Board of Trustees for action in conformity with policies adopted by the House of Delegates. The Council on Dental Education shall have authority on behalf of this Association to accredit dental schools and schools in related fields of dental education, to approve hospital dental departments, internships, residencies and dental specialty boards, in accordance with requirements and standards approved by the House of Delegates.

D. ***Council on Dental Health.*** The Council on Dental Health shall be composed of nine (9) members and its duties shall be:

a. To conduct a study of the oral health needs of the public and of plans to meet such needs; to formulate programs for promoting oral health which shall be submitted to the Board of Trustees for action in conformity with policies adopted by the House of Delegates.

b. To assist constituent and component societies in the development of dental health policies and programs within their jurisdiction.

c. To establish and maintain relations with other agencies interested in programs for the improvement of dental health.

d. To maintain a comprehensive program of dental health educational services.

E. ***Council on Dental Museum and Registry.*** The duties of the Council on Dental Museum and Registry shall be:

a. To secure pathological and historical materials for museum exhibits for educational and training purposes and to disseminate information thereon.

b. To maintain a registry of oral and pathological specimen case histories.

F. ***Council on Dental Research.*** The duties of the Council on Dental Research shall be:

a. To formulate plans for encouraging, establishing and supporting programs of research in all fields pertaining to dental materials used in reparative and reconstructive operations in the oral cavity and to submit such plans to the Board of Trustees for action in conformity with policies adopted by the House of Delegates.

b. To investigate the causes of diseases and abnormalities of the oral cavity.

G. ***Council on Dental Therapeutics.*** The duties of the Council on Dental Therapeutics shall be:

a. To study, evaluate and disseminate information with regard to dental therapeutic agents, their adjuncts and dental cosmetic agents which are offered to the public or to the profession.

b. To formulate plans for encouraging, establishing and supporting programs of research in the field of dental therapeutics and to submit such plans to the Board of Trustees for action in conformity with policies adopted by the House of Delegates.

c. To maintain a suitable chemical laboratory for assisting the council in carrying out the preceding duties.

H. ***Council on Dental Trade and Laboratory Relations.*** The duties of the Council on Dental Trade and Laboratory Relations shall be:

a. To encourage and develop satisfactory relations with the various organizations representing the dental trade and dental laboratories.

b. To formulate plans for establishing and maintaining the greatest efficiency of the dental trade and dental laboratories in their relation to the dental profession and to submit such plans to the Board of Trustees for action in conformity with policies adopted by the House of Delegates.

I. ***Council on Federal Government Dental Corps.*** The duties of the Council on Federal Government Dental Corps shall be:

a. To review and study the specific problems of the various dental corps.

b. To formulate plans that will increase the efficiency of said corps and to submit such plans to the Board of Trustees for action in conformity with policies adopted by the House of Delegates.

Explanatory Note: The term "federal government dental corps," as used in this Constitution and Bylaws, shall mean the Army Dental Corps, the Naval Dental Corps, the dental officers in the Regular Corps of the United States Public Health Service and the dental officers in the Veterans Administration.

J. ***Council on History.*** The duties of the Council on History shall be to study, collect and prepare for publication material of historical interest to the dental profession.

K. ***Council on Insurance.*** The duties of the Council on Insurance shall be to consider the problem of insuring the members of this Association for their protection in any manner whatsoever and make recommendations regarding such plans to the Board of Trustees for action in conformity with policies adopted by the House of Delegates.

L. ***Council on International Relations.*** The duties of the Council on International Relations shall be to cooperate with dentists and dental groups in countries other than the United States for the purpose of exchanging dental knowledge and information in conformity with policies adopted by the House of Delegates.

M. ***Council on Journalism.*** The duties of the Council on Journalism shall be to sponsor annual conferences to be held at the same time as the annual session of the Association and to develop standard methods and programs for the advancement of dental journalism in accordance with the rules and regulations adopted by the House of Delegates. The Editor of *The Journal of the American Dental Association* shall be a member *ex officio.*

N. ***Council on Legislation.*** The duties of the Council on Legislation shall be:

a. To protect and further the interests of the public and the dental profession in matters of patents, legislation and regulations and to make recommendations of plans and methods to the Board of Trustees in conformity with policies approved by the House of Delegates.

b. To disseminate information which will assist the constituent and component societies in their problems involving the enactment and enforcement of legislation affecting the dental health of the public or the practice of dentistry.

O. ***Council on Membership.*** The duties of the Council on Membership shall be:

a. To conduct a study of membership problems and formulate plans for maintaining and increasing the membership of this Association. Such plans shall be submitted to the Board of Trustees for action in conformity with policies adopted by the House of Delegates.

b. To review applications for active membership in this Association from applicants practicing in territories or dependencies of the United States or in federal government dental corps in which no constituent society is chartered, and to make recommendations regarding same to the Board of Trustees.

c. To review all applications for affiliate membership in the Association and make recommendations regarding same to the House of Delegates.

P. ***Council on Relief.*** The Council on Relief shall formulate plans for increasing the principal of the Relief Fund of this Association and recommend rules and regulations for the granting of financial aid to dentists, their dependents and survivors. It shall submit such plans and recommendations to the Board of Trustees for action in conformity with policies adopted by the House of Delegates.

Q. ***Council on Scientific Session.*** The Council on Scientific Session shall serve as the general program committee for the annual scientific session of the Association with full power to approve or disapprove the program of any section as submitted by the officers in charge, even to the extent of omitting the program of any section in any year. It shall be its duty (1) to determine the number of general meetings held during each scientific session; (2) to prepare a program for each meeting; (3) to co-ordinate the programs of the several sections; (4) to establish rules and regulations for governing section officers in the performance of their duties, subject to approval by the Board of Trustees.

R. ***Judicial Council.*** The duties of the Judicial Council shall be:

a. To consider proposals for amending the Code of Ethics and to make recommendations regarding same to the House of Delegates and the Board of Trustees.

b. To provide advisory opinions regarding the interpretation of the Code of Ethics.

c. To consider appeals from members of the Association under sentence of censure, probation, suspension or expulsion by a constituent society and to hold hearings and render decisions thereon. In such instance, the accused member shall have transmitted to him a written copy of the charges brought against him together with a notice of the time and place of the hearing, such notice to be sent by registered letter addressed to his last known address and mailed not less than thirty days prior to the day set for the hearing. Every decision which shall result in censure, probation, suspension or expulsion of a member shall be reduced to writing and shall contain a copy of the charges made against the accused member, a recital of the facts, the verdict rendered and the penalty imposed. Within ten days of the day on which the decision is rendered a copy thereof shall be sent by registered mail to the last known address of each of the following parties: the accused member; the secretary of the component society to which he belongs, if any; the secretary of the constituent society to which he belongs, if any; the chairman of the Judicial Council of this Association and the Secretary of this Association.

d. To hold a hearing and render a decision in every case in which a member of this Association who is not a member of a constituent society is charged (1) with having been found guilty of a felony, (2) with having been found guilty of violating the dental practice act of a territory, dependency or country, or (3) with violating these Bylaws or the Code of Ethics of this Association.

S. ***National Board of Dental Examiners.*** The duties of the National Board of Dental Examiners shall be:

a. To provide and conduct examinations, exclusive of clinical demonstrations, in the art and science of dentistry for the purpose of determining the qualifications of persons who desire to enter dental practice in any state, district, territory or dependency of the United States. Licensure to practice is subject to the laws of the states, districts, territories or dependencies, and the right to conduct all practical examinations is reserved to the individual boards of dental examiners in such states, districts, territories or dependencies.

b. To make such rules and regulations as may be necessary for the conduct of the previously mentioned examinations and for the issuance of a certificate of qualification to successful candidates. Such certificate may be recognized and accepted by the several boards of dental examiners in lieu of their own examinations.

Section 110. *Privilege.* Chairmen and members of Councils who are not members of the House of Delegates shall have the right to present their reports in person to the House of Delegates and to participate in the debate thereon but shall not have the right to vote.

Chapter X *Special Committees*

Section 10. Special committees of this Association may be created at any session of the House of Delegates to serve until adjournment *sine die* of the next annual session of the House of Delegates for the purpose of performing any duty not otherwise assigned by these Bylaws. The authority for appointing the members of a special committee shall be set forth in the action creating such committee.

Section 20. *Privilege.* Chairmen and members of special committees who are not members of the House of Delegates shall have the right to present their reports in person to the House of Delegates and to participate in the debate thereon but shall not have the right to vote.

Chapter XI *Bureaus*

Section 10. *Number and Name.* There shall be three (3) bureaus of this Association:

A. Bureau of Statistics
B. Bureau of Public Information
C. Bureau of Library and Indexing Service

Section 20. *Personnel:* The personnel of all bureaus shall be employees of the Association.

Section 30. *Advisory Committees:* Each bureau shall have an advisory committee consisting of five (5) active or life members of this Association. Nominations for these advisory committees shall be made by the Board of Trustees and additional nominations may be made by the House of Delegates. Members of advisory committees shall be elected by the House of Delegates, in accordance with Chapter XII, Section 10, to serve for a term of three (3) years each, except that at the first election after the adoption of this section of the Bylaws one (1) member shall be elected to each committee for one (1) year, two (2) members for two (2) years and two (2) members for three (3) years. At the end of their term of office successors shall be elected for a term of three (3) years. One (1) member of each committee shall be appointed annually by the Board of Trustees to serve as chairman for the ensuing year. It shall be the duty of each advisory committee to review the activities and the plans of its respective bureau at least once each year and to advise the Secretary of the Association and the Board of Trustees regarding same.

Section 40. *Duties:* Specific duties of each bureau shall be assigned by the Board of Trustees through the Secretary of the Association under whose jurisdiction each shall operate. The general duties of each bureau shall be:

A. ***Bureau of Statistics.*** To collect, compile, develop, analyze and disseminate data and statistics that concern the dental profession.

B. ***Bureau of Public Information.*** To develop and maintain a public relations program for this Association, including the dissemination of information and publicity concerning activities of this Association.

C. ***Bureau of Library and Indexing Service.***

a. To maintain and develop the library service of the Association.
b. To prepare and cause to be published an index of the dental periodical literature.
c. To develop uniform standards of nomenclature in the field of dental science.
d. To maintain the archives of the Association.

Chapter XII *Election of Officers*

Section 10. Members of the Board of Trustees and members of councils and committees shall be elected by the House of Delegates except as otherwise provided in these Bylaws. Voting shall be by ballot, and the Secretary shall provide facilities for voting on the morning of the day of the last meeting. The polls shall be open for at least three (3) hours and shall be closed prior to the opening of the last meeting of the House of Delegates. The candidates receiving the largest number of votes shall be considered elected.

Chapter XIII *Scientific Sessions*

Section 10. ***Object:*** The scientific session of this Association is established to foster the presentation and discussion of subjects pertaining to the science and art of dentistry.

Section 20. ***Time and Place:*** One (1) scientific session shall be held annually at a place selected by the House of Delegates from recommendations presented by the Board of Trustees. Such selection shall be made at least one (1) year but not more than three (3) years in advance. The selected time and place for holding any session may be changed by three-fourths (¾) affirmative vote of the members of the Board of Trustees, and such change shall be made at least sixty (60) days prior to the time selected for the session.

Specific dates for holding the scientific session shall be determined each year by the Board of Trustees at least six (6) months in advance.

Section 30. ***Management and General Arrangements:*** The Board of Trustees shall provide for the management of, and make all arrangements for, each scientific session not otherwise provided for in these Bylaws.

Section 40. ***General Meetings:*** There shall be at least one (1) and not more than three (3) general meetings at each scientific session. The number shall be determined by the Council on Scientific Session.

Section 50. ***Section Meetings:***

A. ***Name.*** Each scientific session shall consist of the general meetings and the following section meetings, unless omitted by the Council on Scientific Session:

a. Clinics
b. Dental health education exhibits
c. Full denture prosthesis
d. Hospital dental service
e. Operative dentistry
f. Oral surgery
g. Orthodontics
h. Partial denture prosthesis
i. Pedodontics, oral hygiene
j. Periodontia
k. Practice management
l. Research
m. Roentgenology
n. Scientific exhibits

B. ***Officers:*** The officers of each section shall be a chairman, vice-chairman and a secretary appointed annually by the Council on Scientific Session subject to the approval of the Board of Trustees. It shall be their duty to prepare and present a program for their respective sections in accordance with rules and regulations established by the Council on Scientific Session.

Section 60. ***Trade and Laboratory Exhibits:*** Products of the dental trade and laboratories and other products may be exhibited at each scientific session under the direction of the Board of Trustees and in accordance with rules and regulations established by that body.

Section 70. ***Admission:*** Admission to meetings of the scientific sessions shall be limited to members of this Association who are in good standing and to others invited in accordance with rules and regulations established by the Board of Trustees.

Chapter XIV *Publications*

Section 10. ***Official Journal:***

A. ***Title:*** This Association shall publish or cause to be published an official journal under the title of *The Journal of the American Dental Association,* hereinafter referred to as *The Journal.*

B. ***Object:*** The object of *The Journal* shall be to report, chronicle and evaluate activities of scientific and professional interest to members of the dental profession.

C. ***Frequency of Issue and Subscription Rate:*** The frequency of issue and the subscription rate of *The Journal* shall be determined by the Board of Trustees.

D. ***Editor:*** The Editor of the Association shall be editor of *The Journal.*

Section 20. ***Specialty Journals:*** This Association may publish or cause to be published journals in the field of the dental specialties under the editorial supervision of the Editor of the Association and subject to the direction and regulations of the Board of Trustees.

Section 30. ***Official Transactions:*** The official transactions of the House of Delegates and the Board of Trustees and the reports of officers, councils and committees shall be published under the direction of the Secretary.

Section 40. ***Index of the Dental Periodical Literature:*** This Association shall publish or cause to be published an *Index of the Dental Periodical Literature* under the supervision of the Bureau of Library and Indexing Service.

Section 50. ***Accepted Dental Remedies:*** This Association shall publish or cause to be published *Accepted Dental Remedies* under the supervision of the Council on Dental Therapeutics.

Chapter XV *Finances*

Section 10. ***Membership Dues:***

A. ***Active Members:*** The dues of active members shall be twelve dollars ($12.00) due January 1 of each year.

B. ***Affiliate Members:*** The dues of affiliate members shall be ten dollars ($10.00) due January 1 of each year.

C. ***Student Members:*** The dues of student members shall be six dollars ($6.00) due January 1 of each year. Undergraduate membership terminates on December 31 after graduation. In order to become an active member of the Association an undergraduate member must make application to a constituent or component society.

D. ***Life and Honorary Members:*** Life and honorary members shall be exempt from payment of dues.

E. ***Associate Members:*** The dues of associate members shall be ten dollars ($10.00) due January 1 of each year.

F. All members, except life and honorary members, elected after July 1, shall pay one-half (½) of the current year's dues.

Section 20. *Fiscal Year:* The fiscal year of this Association shall begin on January 1 of each calendar year and end on December 31 of the same year

Section 30. *General Fund:* The General Fund shall consist of all monies received other than those specifically allocated to other funds by these Bylaws. This fund shall be used for defraying all expenses incurred by this Association not otherwise provided for in these Bylaws.

Section 40. *Relief Fund:*

A. ***Purpose:*** This Association shall establish a Relief Fund, fully detached from any other fund of the Association, for the purpose of granting financial aid to dentists, their dependents and survivors in accordance with rules and regulations formulated by the Council on Relief and approved by the Board of Trustees.

B. ***Principal:*** The principal of this fund shall be invested in the name of the Association in nonspeculative securities and shall be derived from:

a. A specified portion, determined by the Board of Trustees, of all monies received from Christmas seal campaigns.

b. Direct contributions and earnings.

C. ***Disbursements:*** Disbursements shall be made only from earnings and from principal in excess of five hundred thousand dollars ($500,000.00) and then only for paying approved grants-in-aid to dentists, their dependents and survivors.

Section 50. *Research Fund:*

A. ***Purpose:*** This Association shall establish a Research Fund for the purpose of promoting and advancing dental research.

B. ***Principal:*** The principal of this Fund shall be derived direct from contributions and earnings.

C. ***Disbursements:*** Disbursements may be made from the principal to further the purpose of the Fund.

Chapter XVI *Indemnification of Officers and Trustees*

The Association shall indemnify and hold harmless each trustee and each officer now or hereafter serving the Association from and against any and all claims and liabilities to which he may be or become subject by reason of his now or hereafter being or having heretofore been a trustee and/or officer of the Association and/or by reason of his alleged acts or omissions as a trustee and/or officer as aforesaid, and shall reimburse each trustee

and each officer of the Association for all legal and other expenses reasonably incurred by him in connection with defending against any such claims or liabilities, provided, however, that no trustee or officer shall be indemnified against or be reimbursed for any expenses incurred in defending against any claim or liability arising out of his own negligence or willful misconduct. The foregoing rights of trustees and officers shall not be exclusive of other rights to which they may be entitled lawfully.

Chapter XVII *Amendments*

These Bylaws may be amended at any session of the House of Delegates by a two-thirds (2/3) majority vote of the members present and voting, provided the proposed amendments shall have been presented in writing at a previous session or a previous meeting of same session.

Chapter XVIII *Enactment*

This Constitution and Bylaws, which take the place of and render null and void hereafter all previous Constitutions and Bylaws and all standing resolutions which are inconsistent or in conflict with any provisions of this Constitution and Bylaws, shall go into effect immediately.

Until the first election after the adoption of these Bylaws, the President shall act as the speaker of the House. All officers of committees, commissions and councils shall function until their successors have been elected and installed. All councils, committees, commissions and bureaus shall be subject to all rules and regulations previously adopted by the House of Delegates provided they are not inconsistent or in conflict with these Bylaws.

NEWS OF DENTISTRY

DENTAL RESEARCH BILL PASSED BY CONGRESS

SENT TO PRESIDENT TRUMAN FOR SIGNATURE

The new dental research bill (H.R. 6726) sponsored by Rep. W. E. Brehm (R., Ohio), which provides for the establishment of a national dental research institute as part of the National Institute of Health, was passed by Congress on June 14, and sent to the White House for signature by President Truman. The new bill is in the form of an amendment to the Public Health Service Act and was fully endorsed by Carl O. Flagstad, chairman of the Committee on Legislation of the American Dental Association.

The new measure provides for an appropriation of two million dollars for the construction and equipment of a dental research building and $750,000 annually for research purposes. The original Association-backed measure (S. 176), which was passed last summer by the Senate, provided for two million dollars for a research building and $730,000 annually for research purposes.

Association Opposes Limited Bill

S. 176 and two identical House bills, H.R. 4200 and H.R. 574, were shelved by the House Committee on Interstate and Foreign Commerce when a second Brehm bill, H.R. 6470, was reported favorably, May 12. This limited Brehm bill provided only for grants totaling $750,000 to dental schools and other institutions for research purposes. It was vigorously opposed by the Association.

The new bill (H.R. 6726) provides that the dental research institute shall be operated by the Surgeon General of the U.S. Public Health Service in consultation with a National Advisory Dental Research Council consisting of twelve appointed members plus the Surgeon Generals of the Public Health Service, Army and Navy, and the chief medical officer of the Veterans Administration. The bill provides that the twelve appointed members be "leaders in the fields of fundamental sciences, medical sciences, education or public affairs" and that six of the twelve shall be leading dental, medical or scientific authorities, four of which shall be dentists. There is nothing in the new bill, however, to prohibit the appointment of more than four dentists.

The new dental research measure also includes a new provision for the training and instruction of research workers at the dental institute and elsewhere under special grants which was not authorized under the original bills. Provisions for grants to dental schools and other institutions for research purposes are identical to those included in the earlier bills.

The House of Representatives unanimously passed the new research bill on June 8 after deleting the two million dollar appropriation for the research building. This provision was restored when the bill was taken up in the Senate on June 14. Conferees of the two houses of Congress who met immediately after the Senate action agreed to retain the provision for the research building, and the House of Representatives concurred as soon as the conference report was presented. President Truman's approval,

which is expected to be announced shortly, is all that remains to complete successfully the eight year campaign of the Association for the establishment of a national institute where research into the causes of dental diseases can be advanced.

Flagstad Praises Rep. Brehm

Dr. Flagstad was outspoken in praise of Rep. Brehm for his work in securing Congressional approval of the measure. In a formal statement, Dr. Flagstad said:

> The American Dental Association is again indebted to Congressman Walter Brehm of Ohio for his excellent work as champion of the dental research legislation in the eightieth session of Congress. At a crucial moment when the passage of the bill in the House Committee was uncertain Congressman Brehm introduced a substitute bill which overcame the objections and secured its passage by the House. Dr. Brehm throughout this session has worked incessantly with Congressional leaders to secure favorable consideration for the dental research legislation and to have them pave the way for its progress through Congress.
>
> Congressman Brehm in the first session of the eightieth Congress did excellent service for the American Dental Association in aiding the securing of favorable consideration for the promotion and pay bills for dental officers. He is a member of the profession and the American Dental Association. It is good to have such friends in Congress who understand the dental health problem. Ohio is to be congratulated on sending Dr. Walter Brehm to Congress as he is an excellent public servant and is well equipped to judge the value of proposed dental health legislation.

A. D. A. AFFAIRS

TRUMAN PLEDGES SUPPORT OF A.D.A. HEALTH PROGRAM

In a special conference with H. B. Washburn, president of the American Dental Association, at the White House on May 19, President Harry Truman pledged his support of the three point Association program of increased dental research, expanded dental health education, and the extension of dental care to greater numbers of people.

President Truman expressed his particular concern for providing adequate health services to the middle group of citizens between the indigent and the high income groups. He said that he felt that this large group is trapped to a great extent by the high cost of living generally, leaving inadequate funds for necessary health services.

Dr. Washburn pointed out the importance of consultations with the dental profession in the planning of measures designed to extend health services. Dr. Washburn said that the A.D.A. is ready to cooperate in such planning but that the Association would like to be consulted in the beginning of such planning rather than be called in after the plans are completed and ready for Congressional action.

President Truman agreed with this point of view and remarked that members of the dental profession attended the recent National Health Assembly in Washington, May 1 to 4, where ten year health goals for the nation were formulated.

DENTISTS PURCHASE MORE THAN $45,000 OF CHRISTMAS SEALS

A total of $45,625.07 had been received by the American Dental Association as of May 31, as a result of the purchase of Christmas Seals for the benefit of destitute dentists.

HORNER REMAINS AS SECRETARY OF COUNCIL ON DENTAL EDUCATION

At the unanimous request of the Council on Dental Education, Harlan H. Horner has agreed to remain as secretary of the Council until October 1.

Originally, Dr. Horner had planned to retire on July 1. A successor to Dr. Horner, who has been secretary of the Council since 1940, will be recommended by the Council to the Board of Trustees at its meeting immediately prior to the eighty-ninth annual Association meeting in Chicago next September.

CHICAGO HAS 4,000 HOTEL ROOMS AVAILABLE FOR A.D.A. MEETING

Housing accommodations for the eigthy-ninth annual session of the American Dental Association to be held in Chicago, September 13 to 17, will be considerably less tight than at the eighty-eighth annual meeting at Boston, last August. A total of 4,000 hotel rooms, one-third more than were available at Boston, have been promised the Association by the Greater Chicago Hotel Association. All room reservations for the meeting will be handled through a special housing bureau similar to that used for the Boston meeting.

Requests for room reservations must be made on official blanks as printed in the June issue of THE JOURNAL, and mailed to the American Dental Association Housing Bureau, Room 808, 105 W. Madison St., Chicago 2. Reservation blanks will be printed in the July, August and September issues of THE JOURNAL. Additional copies may be secured from the Housing Bureau or the Association's central headquarters.

DENTAL SOCIETIES

ELECTIONS AND OTHER ACTIVITIES OF STATE, COMPONENT SOCIETIES

Chicago.—The Chicago Dental Society, to encourage continued scientific research in all phases of dentistry, again offers a cash prize of $500 to the author of the most meritorious essay reporting an original investigation and containing new and significant material of value to dentistry.

Any member of the American Dental Association, or of a recognized foreign dental society, or anyone affiliated with a recognized institution in the dental field may apply for authorization to enter the competition. Application forms and contest rules may be obtained by writing to the Chicago Dental Society, 30 N. Michigan Ave., Chicago 2. Applications must be filed in the office of the Society by October 2, 1948.

The winner of the award will be invited to present his essay at the eighty-fourth midwinter meeting of the Chicago Dental Society to be held in Chicago, February 7 to 10. In addition to the prize of $500, the expenses of the winner will be paid by the Society.

Illinois.—The following are the new officers of the Illinois State Dental Society, elected at the recent meeting of the Society in Springfield: Glenn E. Cartwright, president-elect; Carl W. Holz, vice-president; Paul W. Clopper, secretary, and M. E. Zinser, treasurer.

Louisville.—The Louisville District Dental Society elected the following officers at its regular meeting, May 20, 1948: Marcus G. Randall, president; Earl K. Hafner, vice-president, and Vincent A. Tagliarino, secretary-treasurer.

Michigan.—New officers of the Michigan State Dental Society, as the result of the election of April 13, are: George Christiansen, president-elect; David Seligson, vice-president; A. V. Diedrich (re-elected) and Russell E. Klinestecker, councilmen. L. H. Andrews was installed as president.

Middlesex (N. J.).—The Middlesex County Dental Society of New Jersey elected its new officers on May 20. They are: Milton J. Levy, president; M. E. Schwartz, president-elect; Lewis Katz, vice-president. Theodore V. Symanski

and Philip Fass were re-elected as secretary and treasurer, respectively.

Monongahela (W. Va.).—Newly elected officers of the Monongahela Valley Dental Society of West Virginia, are: Charles Cunningham, president; R. J. Vassar, vice-president; H. W. Kennedy, secretary-treasurer, and Ward Sturm, member to executive council.

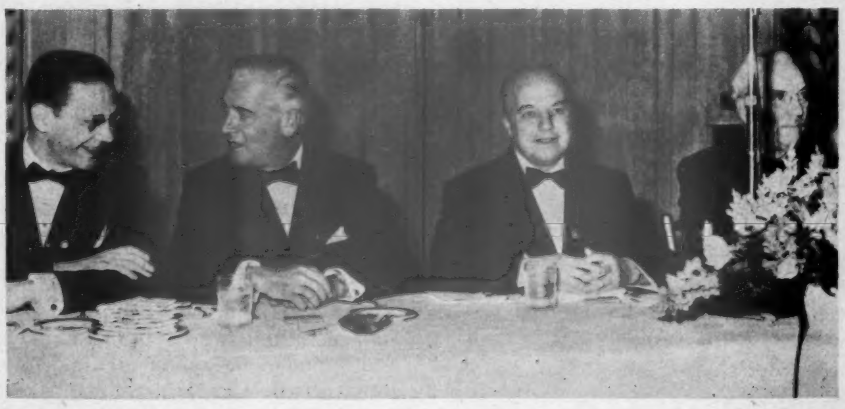
New York.—The First District Dental Society of New York announces the annual Lord-Chaim Prize contest for 1948. Five hundred dollars is offered each year for a meritorious essay on any subject which may have a dental application. The essay may deal with research in the fundamental sciences or with any practical or clinical phase of dentistry.

Further information may be obtained by addressing: Miss E. M. Davies, Executive Secretary, First District Dental Society, Hotel Pennsylvania, New York 1.

San Francisco.—The San Francisco District Dental Society recently presented John S. "Jay" Martin, formerly of Elko, Nev., with an honorary life membership, the seventh which has been awarded in 79 years. Dr. Martin was totally incapacitated by injuries during the heavily contested battle of Attu in the last war and thus has not been able to practice his profession.

Shawnee (Kan.).—Edward E. Carpenter recently was honored for his more than fifty years of service in the dental profession at a dinner meeting of the Shawnee County Dental Society of Kansas. Dr. Carpenter began practicing dentistry in Topeka, Kan., in 1897 and since that time he has been the president of the Topeka Dental Society, the First District Dental Society of Kansas and the Kansas State Dental Association.

Southern California.—The Southern California State Dental Association, through its Council on Dental Health, has developed a new dental health booklet for furnishing dental education material. The Southern California association also has organized a speakers' bureau, has planned radio broadcasts on dentistry for children and has published numerous articles in the daily press of the southern California area concerning dental health and dental education material.



Present at the 1948 annual meeting of the Illinois State Dental Society were, left to right, Harold Hillenbrand, secretary of the American Dental Association; Honorable Dwight H. Green, governor of Illinois; Robert G. Kesel, president of the Illinois State Dental Society, and H. B. Washburn, president of the Association

COPIES OF *HISTORY OF MISSOURI DENTISTRY* ALMOST EXHAUSTED

The History Committee of the Missouri State Dental Association announces that the present supply of *The History of Dentistry in Missouri* is almost exhausted. A second edition will not be published when the present edition is sold.

A copy of this historic volume may be secured by writing to the History Committee, Missouri State Dental Association, 346 N. Boyle Ave., St. Louis 8, and enclosing $2 to cover the cost of the book.

HAMILTON IS NAMED EDITOR OF MISSOURI DENTAL JOURNAL

B. Bates Hamilton, former editor of the *Kansas City District Dental Journal*, has been selected as the new editor of the *Missouri State Dental Journal* to succeed Floyd Alcoin, who recently retired from the position.

The new state editor will continue temporarily as editor of the Kansas City *Journal* until another editor can be selected.

DENTAL EDUCATION

RAISE TUITION IN HARVARD SCHOOL OF DENTAL MEDICINE

James B. Conant, president of Harvard University, announced on April 5 that there will be an increase in tuition for all students in the Harvard School of Dental Medicine and in the Harvard Medical School. Tuition, which has been $580 a year since 1945, will be raised to $800 a year beginning in the fall term of 1948.

Officers of both the dental and medical schools assure students that loan funds and scholarships are at hand to assist individuals in meeting the increased cost. Also, additional scholarship funds will be available next fall. C. Sidney Burwell, dean of the Faculty of Medicine which administers both the medical and dental schools, estimates that, "Funds available for scholarships will be more than doubled next year."

To help offset the increasing costs of medical and dental education, the two schools are making efforts to obtain additional endowment.

AUTHORITY ON CARIES REDUCTION IS APPOINTED TO HARVARD

Reidar F. Sognnaes, an authority on caries and a recent winner of a Norwegian dental prize for research in reduction of caries, recently was named associate professor of dental medicine of the Harvard School of Dental Medicine.

Dr. Sognnaes was born in Oslo, Norway, where he received the Bachelor of Science degree at the University of Oslo. He studied at the University of Leipzig in Germany and he received the Master of Science and Doctor of Philosophy degrees at the University of Rochester in this country.

He has done research work at the University of Rochester Medical School and at the Forsyth Dental Infirmary in Boston.

TWO DENTAL RESEARCH PROJECTS ARE AWARDED TO TUFTS COLLEGE

Two more contracts have been completed recently for Navy supported dental research projects. The new projects, which will be carried out at Tufts College Dental School in Medford, Mass., are "Research in the Field of Bacteriemias Resulting from Tooth Extractions and Periodontal Treatments" and "Research in the Determination of Masticatory Efficiency and Its Controlling Factors."

The addition of these two contracts makes a total of nine dental research

projects that are being carried on at several civilian institutions with funds provided by the Office of Naval Research.

PLAN NEW DENTAL BUILDING AT HOWARD UNIVERSITY

Plans for adding a new $1,805,430 dental school to the Howard University College of Dentistry recently have been completed. The actual construction will begin in the near future.

The dental school recently was accredited by the Council on Dental Education of the American Dental Association. In the official report to Russell A. Dixon, dean of the College of Dentistry, it was stated that, "Howard continues to enroll a high percentage of college graduates. It stood in the first four schools in this regard in the original survey (in June 1943) and apparently has not lost its place."

BEGIN PROGRAM IN POSTGRADUATE PEDODONTICS AT U. OF TENNESSEE

A program of postgraduate study in dentistry for children was inaugurated on January 1 at the College of Dentistry, University of Tennessee. This program is a cooperative project of the University of Tennessee and the Department of Public Health and was made possible through a grant from the United States Children's Bureau.

The program consists of three postgraduate courses in pedodontics, a number of companion externships and one fellowship for research and advanced study. Also under the program, the University of Tennessee offers a refresher course of approximately 80 hours to be given as requested by groups of six or less, in two weeks or in a number of short sessions during any school quarter. School quarters begin in March, July, September and January.

Requests for applications for any of these postgraduate courses, which are not restricted to dentists in Tennessee, should be addressed to R. D. Dean, Dean of the College of Dentistry, University of Tennessee, 718 Union Ave., Memphis, Tenn. Further information may be secured from R. D. Hayes, director of the postgraduate program, at the same address.

OFFER COURSE IN RESTORATIVE DENTISTRY FOR TEACHERS

The Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania will offer a postgraduate course on Principles of Restorative Dentistry for teachers of operative and prosthetic dentistry including bridges, August 23 to 31.

The course is offered to a limited number of teachers of clinical dentistry. For further information concerning enrollment, fee, class schedule and description of the classes write to the Postgraduate Division, The Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 4001 Spruce St., Philadelphia 4.

CONTINUATION STUDY PROGRAM BEGINS IN AUGUST AT U. OF CAL.

The College of Dentistry, University of California will offer a series of courses as a part of a program of continuation studies from August 2 to September 11.

Instructors and their courses are as follows: Gordon M. Fitzgerald, dental roentgenology; David Grimm, exodontia; Everett M. Finger, electro-formed copper die technic; Charles S. Lipp and Jerome C. Strain, oro-facial prosthesis; Edmund V. Street and Raymond Greene, amalgam technic; J. Raymond Gill and Seizo Murata, crown and bridge prosthodontia; George A. Hughes and George F. McGee, prostho-

dontia; Nina Simmonds, nutrition and its relation to dental problems; Wesley G. Irons, head and neck anatomy, and Hermann Becks, dental medicine.

For further information about any of these courses, write to Dr. Gordon M. Fitzgerald, Head, Dental Extension, University of California College of Dentistry, San Francisco 22.

GRADUATE WORK IN PEDODONTICS OFFERED AT U. OF NEBRASKA

Graduate work in pedodontics, leading to the degree of master of science in dentistry, is being offered by the Graduate College and the College of Dentistry, University of Nebraska. The course is designed to meet the needs of the dentist who plans to devote his entire practice to pedodontics or the dentist who wishes to broaden his knowledge as a foundation for teaching or research.

The course of study will be arranged to meet the needs of the individual candidate. Applicants for admission to graduate standing in dentistry must present evidence of graduation from an approved dental college. Graduate work in this field may begin either at the time of the September or February semesters.

For more information concerning requirements for the course and for a thorough description of the course of study write to the Dean of the Graduate School or to Ralph L. Ireland, Chairman, Department of Pedodontics, College of Dentistry, University of Nebraska, Lincoln 8, Neb.

U. OF ILL. OFFERS GRADUATE COURSE IN PEDODONTICS IN FALL

A graduate course in pedodontics designed to meet the needs of practitioners who wish to specialize in the practice of dentistry for children will be offered, beginning September 13, for nine months on a full time basis at the College of Dentistry, University of Illinois.

The course offers full training in basic technics, basic sciences and clinical practice. The basic technic and basic science courses will be taken together with students in graduate orthodontics, under the supervision of Allan G. Brodie, head of the Department of Orthodontia.

Clinical work will rotate among normal children entering the dental school clinic, as well as hospitalized and institutionalized children. The field of dental pediatrics will be covered with the aid of facilities of the Department of Pediatrics at the College of Medicine, University of Illinois.

Dentists who are eligible for a Master of Science degree in Pedodontics will be required to complete a research project.

Further information may be secured by writing to Dr. Maury Massler, College of Dentistry, University of Illinois, 808 S. Wood St., Chicago 12.

ANNOUNCE REFRESHER COURSES IN PEDODONTICS FOR 1948-1949

The College of Physicians and Surgeons, School of Dentistry, will offer eight refresher courses in dentistry for children during the school year beginning September 1948.

The courses are designed to assist practicing dentists in gaining an understanding of the child patient, to refresh operative technics and to review recent developments of caries control, anesthesia, pulp therapy, cavity preparation and restorations for primary and young permanent teeth. Each class is for a period of eight days and the number of registrants for each class is limited to ten. The tuition for the course is $75; the course has been approved by the Veterans Administration under the G.I. Bill of Rights.

For further information about these refresher courses, write to Ernest G. Sloman, Dean, School of Dentistry, College

of Physicians and Surgeons, 344 Fourteenth St., San Francisco 3.

U. OF ILLINOIS PRESENTS TWO REFRESHER COURSES IN JULY

The University of Illinois College of Dentistry will present refresher courses in Complete Denture Prosthesis and Minor Oral Surgery, starting Tuesday, July 6. Registration in both courses is limited and applications will be considered in the order in which they are received.

Further details regarding these courses may be obtained by writing Dr. Isaac Schour, Associate Dean in Charge of Postgraduate Studies, College of Dentistry, University of Illinois, 808 S. Wood St., Chicago 12.

INTERNATIONAL

F.D.I. TO HOLD 1948 ANNUAL SESSION IN DUBLIN IN AUGUST

The 1948 annual session of the Fédération Dentaire Internationale will be held in Dublin, Eire, August 2 to 8 at the Shelbourne Hotel. The session will begin with an informal reception on Monday evening, August 2, and will proceed Tuesday through Saturday, with the formal business of the organization including the meetings of the several commissions, the executive council, the Bureau and the scientific programs.

The annual meetings are devoted to the preparation of the quinquennial international dental congresses and are particularly interesting to those dentists who intend to collaborate in the preparatory work of these congresses or who wish to make researches on subjects which form the agenda of the various commissions: dental hygiene, education, documentation and legislation, public dental service, scientific research, terminology and publications. The next International Dental Congress will be held in London in 1952.

American dentists who plan to attend the annual meeting of the F.D.I. should write personally to Dr. B. D. S. Gallivan, Secretary, Irish Dental Association, 32 N. Frederick St., Dublin, Eire, for reservations. As for traveling accommodations, those interested should write to Dr. G. H. Leatherman, 35 Devonshire Place, London W. 1, England.

HOLD SEVENTH PACIFIC SCIENCE CONGRESS IN NEW ZEALAND

The National Research Council of the United States and its scientists, institutions and organizations have been invited by the Royal Society of New Zealand to participate in the Seventh Pacific Science Congress which will take place in New Zealand, February 2 to 22, 1949.

Members of the dental profession are notified of the Division of Public Health and Nutrition symposiums. The symposium on "Dental Caries Among Pacific Peoples" will be of special interest to dentists.

A more detailed program of the symposiums of interest to dentists will be published in a future issue of THE JOURNAL.

ORAL PATHOLOGISTS TO LECTURE IN SCANDINAVIAN COUNTRIES

Lt. Col. Joseph L. Bernier, Harry Kaplan, Harold W. Krogh and Walter E. Omundson, all of The Registry of Dental and Oral Pathology, Washington, D. C., will depart as a group for Copenhagen, Denmark, on August 4 to present a series of four day lectures in Denmark, Norway and Sweden. The lecturers will be in the Scandinavian countries for three weeks.

The course of instruction will consist of lectures and group conferences on: oral pathology, exodontia, pentothal sodium, surgical treatment of periodontia and procedures in operative dentistry. The courses are being presented under the sponsorship of the Danish Dental Society.

NEW DENTAL SOCIETY IS ORGANIZED IN HONDURAS

The Asociación Dental de la Costa Norte recently was organized in San Pedro Sula, Honduras, Central America. The first officers elected to this new dental society are: Tulio A. Bueso, president; Ramón Figureroa h, secretary, and Guillermo F. Pineda, treasurer.

THREE LEADERS OF 1946 IVORY CROSS EXPEDITION ARE HONORED

Her Majesty Queen Wilhelmina, recently retired regent of The Netherlands, has bestowed the Order of Orange Nassau with the rank of Officer on J. L. T. Appleton, dean of the Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, and L. Herbert Loeb of Boston.

The government of The Netherlands honored these men, the leaders of the Ivory Cross Expedition of 1946, for their assistance in the reconstruction of dentistry in that country.

TWO U.S. INSTRUCTORS NAMED ON MEDICAL MISSION STAFF

Herman DeWilde, instructor in clinical dentistry, Harvard School of Dental Medicine, and Joseph F. Volker, Dean, Tufts College Dental School, are on the staff of the Medical Mission to Germany of the Unitarian Service Committee.

Dr. DeWilde will lecture on new protein sponges for bleeding control, root canal therapy, mucoseal technic in full mouth impressions, and amalgams, pulp capping and silicates. Dr. Volker will lecture on recent advances in preventive dentistry, periodontology and operative dentistry, fluorine and dental health, and mineral metabolism of the teeth as shown by radio phosphorus.

ARMY AND NAVY

A.S.T.P. DENTAL OFFICERS TO SERVE ONLY TWENTY-FOUR MONTHS

Army dental officers who are graduates of the Army Specialized Training Program will be released from service at the conclusion of a twenty-four month tour of duty, according to an announcement issued by the office of the Surgeon General, May 24. Identical action was taken by the Navy Department regarding V-12 trained dental officers.

An officer may be released prior to twenty-four months by the number of days he has accrued leave or he may stay the full twenty-four months and draw two months' pay in a lump sum payment if he has not used any of his authorized leave.

NAVY HAS RESEARCH POSITIONS OPEN TO DENTAL OFFICERS

Excellent facilities now are available for research in medicine and surgery as well as other biological and physical sciences in the research division of the Bureau of Medicine and Surgery of the U.S. Navy.

Active participation in research by dental officers is essential for the effective prosecution of most of the research programs. The Bureau will make every effort to place dental officers with special aptitude, training, experience or inclination for research in appropriate re-

search activities for basic training, to further their advancement by postgraduate training in civilian institutions, and to afford those who so desire a continuous career in research.

NAVY TO INITIATE NEW DENTAL INTERN PROGRAM

Under the new Navy dental intern program, which will be initiated in the fall of this year, twenty members of the graduating classes of civilian dental colleges will be accepted for appointment as commissioned officers in the Dental Corps of the regular Navy. Those selected will undertake a six months' course of postgraduate instruction at the Naval Dental School, National Naval Medical Center, Bethesda, Md. After completing the course at Bethesda, the interns will undertake six more months of intern type training in naval hospitals or similar activities.

Tentatively, several naval hospitals have been approved by the Committee on Hospital Dental Service of the American Dental Association for participation in the intern training program. They are located at St. Albans, Long Island, N. Y.; Philadelphia; San Diego, Long Beach and Oakland, Cal.

Dental Corps officers who satisfactorily complete the twelve months of training will be awarded appropriate certificates.

NAVY ESTABLISHES SECOND DENTAL TECHNICIANS SCHOOL

The U.S. Navy has established a Class A Dental Technicians School at the U.S. Naval Training Center in San Diego. This school and the one previously established at the Great Lakes Naval Training Center will train all dental recruits for the new Dental Technician rating which became effective in April.

Capt. Hector J. A. MacInnis is the first Officer in Charge of the new school.

Gen. George R. Kennebeck, first U.S. Air Force dentist to be promoted to brigadier general

PROMOTE KENNEBECK, AIR FORCE DENTIST, TO BRIG. GENERAL

George R. Kennebeck, chief of the dental division in the office of the Air Surgeon, U. S. Air Force for the past six years, recently was promoted to the rank of brigadier general in the Dental Corps of the U. S. Army. Gen. Kennebeck is the first dental surgeon serving with the Air Force to receive a permanent promotion from colonel to brigadier general.

The 55 year old general was born in Carroll, Ill., and was graduated from the College of Dentistry, University of Iowa in 1916. The following year he was appointed to first lieutenant in the Dental Corps of the U. S. Army.

Gen. Kennebeck is an honor graduate of both the Army Dental School and Medical Field Service School.

9TH NAVAL DISTRICT HEADQUARTERS SEEKS DENTAL LIAISON OFFICER

The Commandant of the Ninth Naval District announces that there will be a vacancy in the billet of Reserve

Dental Liaison Officer in the Ninth Naval District Headquarters starting July 1, 1948. Applicant should be a naval reserve dental corps officer, with the rank of Commander or Lt. Commander.

The reserve dental liaison officer is assigned to the district dental office. His duties are in connection with the Reserve Dental Corps Program which consists of volunteer dental units throughout the Ninth Naval District and the Reserve Dental Officer Training Program which consists of fourteen days training duty for reserve dental officers.

The present reserve dental liaison officer, Cmdr. Walter William Dalitsch, DCR, U.S.N.R., reverted to inactive duty status on June 30, 1948.

Dental officers interested in serving on active duty for a period of one year in the capacity of Ninth Naval District Reserve Dental Liaison Officer should communicate with the Commandant, Ninth Naval District, Great Lakes, Ill. Attention: District Dental Officer.

FORTY-ONE DENTISTS BEGIN ARMY INTERNSHIP IN AUGUST

Forty-one dental students who will graduate this year from civilian dental schools throughout the United States have been accepted for Army dental internship training, scheduled to begin at six Army general hospitals, August 1, 1948, and terminate July 31, 1949.

The interns and the schools from which they graduated are: Northwestern, Lewis R. Atwood; Indiana, Robert D. Avery, Arthur J. Haacke and Robert H. Marlette; Minnesota, Wilfred B. Bell; Western Reserve, Charles B. Bingham and Robert K. Davis; Maryland, William R. Bloxom, Arthur G. Chavoor, John P. Fenton, Richard A. Grzeczkowski and Anthony F. Monaco; Loyola, Polyet M. Breaud and John N. Miles; Ohio State, Thomas J. Brown, Donald E. Schwartz and Everett A. Tracy.

Washington, Donald C. Cates and Harold Nashban; Pennsylvania, Herman K. Dolin and Salvatore A. Cordaro; Pittsburgh, Caesar Fastiggi and Joseph L. Haller; Texas, Duncan C. Howard and Holman S. Smith; Louisville, Herbert A. Keith and Leonard Labine; Nebraska, Robert A. Green, Robert J. Krenz and Cyril O'Brien; Creighton, Wallace L. Lancaster and Anton C. Zeman; Oregon, Thomas P. Monahan; St. Louis, Willis E. Scott and Francis H. Vonnahmen; Illinois, Irving L. Skib; Tufts, Lucian Szmyd; Iowa, Roscoe J. Thoen and Thomas H. Turner; Virginia, Aldolphus G. White, and College of Physicians and Surgeons, Robert J. Flynn.

NAVY DENTISTS BEGIN RESEARCH ON ORAL FUSOSPIROCHETOSIS

The dental research activities of the Naval Medical Research Institute and the National Institute of Health have jointly undertaken a study of the "Epidemiology of Oral Fusospirochetosis." The preliminary portion of this project is being accomplished by the Dental Department of the Great Lakes Naval Training Center.

The entire study is expected to require a period of from five to eight years for completion. The project, divided into several related phases, will be undertaken at large naval centers.

PUBLIC HEALTH

CONFERENCE RESULTS IN REVEALING FACTS ABOUT NATION

Immediate needs for rapidly expanding health, education, welfare and guidance services together with improved institutional and legislative pro-

visions for the rapidly increasing child population in the United States were stressed at the recent conference held in Washington, D. C., preparatory to the White House Conference in 1950.

Approximately three hundred people from all states and territories of the nation and representatives from many national and state organizations attended the conference which was called by Katherine Lenroot, chief of the United States Children's Bureau of the Public Health Service, Federal Security Agency.

Factual information presented at the conference is listed below: forty-five million children of ages below 18 in the nation; two million of school age are not in schools; one million attend very poor schools; one million are taught by teachers having no certificates; three million births last year—50 per cent more than in 1940; population represents two persons for every room; one and one-half million new houses are needed each year; five hundred thousand people live in trailers.

Four million children in homes in which one parent is missing; seven hundred thousand children in divorced families; one hundred thousand children are born out of wedlock each year; $2,100 is average income of families with four or more children; $2,800 is average income of families with two or less children; 9 per cent of wives worked in 1940; 15 per cent of wives worked in 1947; one-fifth of population has moved from one county to another, and two million unemployed in 1947.

FORSYTH SUCCEEDS WRIGHT AS ASSISTANT SURGEON GENERAL

Bruce D. Forsyth, 41, formerly chief dental officer of the Public Health Service Dispensary in Washington, has succeeded William T. Wright, Jr., as assistant surgeon general of the U. S. Public Health Service in charge of the dental division. Dr. Forsyth replaced Dr. Wright, who was assigned to the Office of Indian Affairs in the Interior Department.

Bruce D. Forsyth, now assistant surgeon general of the U.S.P.H.S. in charge of the dental division

Born in Davison, Mich., on May 18, 1907, Dr. Forsyth received a D.D.S. degree from the School of Dentistry, University of Michigan in 1930. His graduate work includes courses at the Mayo Clinic, Rochester, Minn., and at the National Institute of Health. He entered the Public Health Service as an intern in 1931. He was commissioned in the Regular Corps in 1938. His present rank as assistant surgeon general is that of brigadier general.

COMMITTEE OF NATIONAL HEALTH ASSEMBLY MET ON JUNE 28

The executive committee of the National Health Assembly met on June 28 in Washington, D. C., to discuss the winding up of the Assembly's affairs and to pass on the final dispensation of the numerous Assembly Section recommendations and papers. Whether or not any of the activities proposed at the Assembly are to be continued was also

expected to be on the agenda of the executive committee meeting.

A complete report of the results of the meeting will be published in an early issue of THE JOURNAL.

KLEIN, U.S.P.H.S. DENTAL CHIEF, TO WORK IN EUROPE FOR A YEAR

Henry Klein, dental public health administrator, U. S. Public Health Service, Federal Security Agency, has been granted one year's leave from his duties in order to take the position of dental adviser, European Medical Program of the American Jewish Joint Distribution Committee.

Dr. Klein will be located at No. 3 Blvd. de Latour Maubourg, Paris, France.

SEVERAL HEALTH DEPARTMENTS ACQUIRE DENTAL TRAILER UNITS

Columbus, Ohio.—A new dental trailer, fitted with the most modern of dental equipment has been donated to the City Health Department of Columbus by the local Variety Club. It is the aim of the health department officials to administer sodium fluoride applications to the teeth of the children of Columbus. The trailer, manned by a health department dentist and his assistant, is making regular visits to the parochial schools of the city this spring. It is expected that next fall the treatments will be offered to the children in public schools.

Fulton County, Ga.—The Fulton County (Ga.) Health Department, Division of Dentistry, has set up a program designed to serve the elementary school children, white and colored, of Fulton County. The division operates three mobile dental clinics and a central dental clinic. Each unit is staffed by two dentists and one dental assistant. The over-all objective of the program is better dental health through dental education with corrective services for those financially unable to obtain such services privately.

Maine.—Robert Reiss of New York has joined the staff of the Division of Dental Health, State of Maine Department of Health and Welfare, as division dental clinician. Dr. Reiss will operate a mobile dental unit program in the rural sections of the state.

New Hampshire. — The state of New Hampshire is one of the latest states to acquire a mobile dental trailer unit. The State Board of Health, through its Division of Dental Services and H. Shirley Dwyer, director, handled the details of the purchase.

An interesting feature of the New Hampshire trailer is that by simply rearranging the x-ray equipment from its fixed base, it can be placed on mobile legs and wheeled into schools, factories and hospitals when necessary.

GENERAL NEWS

NATIONAL DENTAL VETERANS LEAGUE HOLDS MEMBERSHIP DRIVE

Dentists who are veterans of World War I or II and are interested in improving the dental service in the armed forces are asked to write to Dr. James M. Glenn, Secretary, The National Dental Veterans League, Collierville, Tenn., for a membership application.

The annual dues of The National Dental Veterans League are $3.

ELECT NEW OFFICERS IN AMERICAN ASSOCIATION OF ORTHODONTISTS

Newly elected officers of the American Association of Orthodontists are Lowrie J. Porter of New York, president; Max E. Ernst of St. Paul, president-elect; William R. Humhprey of Denver, vice-president, and George R. Moore of Ann Arbor, secretary-treasurer.

Charles W. Mills

John T. O'Rourke

WELL KNOWN MEMBER OF A.D.A., CHARLES W. MILLS, IS DEAD

Charles W. Mills, 75, of Chillicothe, Ohio, died on March 23 after an illness of several months' duration. Since 1897, Dr. Mills had been a member of the Ohio State Dental Society, and in 1920 he was president of the society.

Dr. Mills was graduated from the Ohio College of Dental Surgery in 1892 and began practicing in Chillicothe soon after. He occupied the same office during the fifty-six years of his practice. During World War I, Dr. Mills was actively interested in the dental corps at Camp Sherman, Chillicothe, where he assisted in the organization of the dental service and gave freely of his time and counsel in order that the men stationed at that camp might receive adequate dental service.

During the years 1926 to 1929, Dr. Mills was chairman of the History Committee of the American Dental Association. He served as a delegate to the annual meetings of the House of Representatives of the Association continuously from 1921 to 1939.

A collection by Dr. Mills of photographs of ex-presidents of the Association is in central headquarters.

JOHN T. O'ROURKE OF TUFTS COLLEGE DIED ON JUNE 3

John T. O'Rourke, director of postgraduate studies in the Tufts College Dental School, died on June 3 at the age of 59. Dr. O'Rourke was born in Saco, Maine, on August 18, 1888. He graduated from the College of Dentistry, University of Louisville in 1917. In 1932, he received a Bachelor of Science degree at the University of Louisville and in 1944, the University conferred the honorary degree of Doctor of Science on him.

Dr. O'Rourke taught in the University of Louisville dental school from 1917 to 1926. He was dean of the College of Dentistry from 1926 to 1944, when he became director of postgraduate studies at Tufts College Dental School.

Dr. O'Rourke also was collaborator in the Curriculum Survey Report in 1935; member of the Council on Dental Education of the American Dental Association from 1938 to 1946; editor of the *Journal of Dental Education* from 1936 to 1940, and the author of *Dental Education in the United States* in collaboration with LeRoy M. S. Miner.

LELAND JOHNSON, PROFESSOR OF ORTHODONTIA AT N.U., DEAD

Leland Johnson, associate professor of orthodontia at the Dental School, Northwestern University, died on May 29 at the age of 53. Dr. Johnson was born on July 24, 1894, in Abingdon, Ill. In 1919, he received a Doctor of Dental Surgery degree from the School of Dentistry, University of Iowa and in 1927, he received a Master of Science in Dentistry degree at the Northwestern University Dental School.

Since 1927, Dr. Johnson had been teaching in the Department of Orthodontia at Northwestern University.

WAGE CAMPAIGN TO RAISE FUNDS FOR NUTRITION CLINIC

A campaign is being conducted to raise a million dollars for the development of an Institute of Human Nutrition at Northwestern University. Thus far, gifts totaling $132,212.50 have been pledged or received in the campaign for funds for clinical research.

Dr. Tom D. Spies, the appointed head of the Institute, is an internationally known authority on problems of nutrition, now in charge of research for the University of Cincinnati at Hillman Hospital Nutrition Clinic, Birmingham, Ala.

INSTITUTION REPORT ASSAILS COMPULSORY HEALTH CARE

Compulsory health insurance was assailed in a special report by the Brookings Institution during the May 9 hearings for the health subcommittee of the Senate Labor and Public Welfare Committee. The authors of the report, Dr. George W. Bachman and Lewis Meriam, charged that the health insurance movement has not only ignored the fact of good and improving conditions, as revealed by mortality rates, but has misused statistics to show evidence of the need for medical care.

The Brookings Institution in its new 271 page volume, *The Issue of Compulsory Health Insurance*, upholds the status quo in medical, dental and hospital care in the United States. The report examines into mortality statistics, racial differences, Selective Service data and other sources, emerging with the finding that "health conditions in the U.S. have so improved in recent years that this country has taken the lead among major nations."

ORGANIZE CHAPTER OF UPSILON ALPHA SORORITY AT TEXAS U.

Iota chapter of Upsilon Alpha, national dental sorority, was established at the School of Dentistry, University of Texas, on April 8 with the initiation of eight undergraduates and seven graduates.

Officers of Iota chapter are Fairfax Moody Hamilton, president; Kathryn Baker Akin, vice-president; Sunshine C. F. Sanger, secretary, and Sarah Malchi Schimmel, treasurer.

PROSTHODONTIC BOARD MAKES INFORMATION BOOKLET AVAILABLE

Booklets of information on the American Board of Prosthodontics are now available for general distribution, according to Irving R. Hardy, secretary-treasurer.

The eight page booklet presents the aim of the American Board of Prosthodontics; lists the qualifications of candidates for examination; describes the steps of certification; tells how to make applications, and divulges other pertinent data concerning the activities of the Board.

These booklets are available to those who write to Dr. Irving R. Hardy, Secretary, Tufts College Dental School, 416 Huntington Ave., Boston 15.

INTERNATIONAL CORRESPONDENCE

News From Cuba

Association Presidents and Secretaries Meet

February 8 was the date for the annual meeting of the dental associations of Cuba, represented by their presidents and secretaries. The report of the activities of the National Association for the second semester of 1947 was read and approved. It was resolved to request the following things: (1) dental examination of workers at the industrial centers of the Nation, (2) the creation of a Directorship of Dentistry instead of the present department at the Ministry of Public Health, (3) control of the sale of dental anesthetic solutions, (4) proper regulation of the law against professional intruders and (5) passage by the Senate of the bill on old age pensions for dentists.

Dr. Salzmann Visits Havana

Dr. J. A. Salzmann of New York visited Havana with his wife, and on February 23 he delivered a lecture on "Prevention and Interception of Malocclusions." Dr. Salzmann was complimented by the Association of Orthodontics of Cuba which organized the event.

Dentistry for Children

During March 12, 13 and 14 a seminar on dentistry for children was held in the city of Pinar del Rio. The seminar, which was directed by Carlos A. Criner, was open to all dentists of the province of Pinar del Rio.

Postgraduate Course in Orthodontics

Organized by the Association of Orthodontists of Cuba, whose president is Carlos Coro, and endorsed by the School of Dentistry of the University of Havana, a postgraduate course in orthodontics was given last December. It was directed by Charles H. Tweed with the collaboration of Hays N. Nance, Cecil D. Stiner, Albert P. Westfall and Robert E. Gaylord.

The course lasted twenty days with average work of six hours daily. A great number of Cuban dentists attended, as well as many from the United States, Argentina, Venezuela and Colombia.

Lecture by Dr. Centeno

Ries Centeno, professor of exodontia of the University of Buenos Aires, visited Havana last January and delivered a fine lecture on "Exodontia Technics" at Colegio Estomatologico Nacional (National Dental Association).

Postgraduate Courses at U. of Havana

In the next meeting of the summer school of the University of Havana there will be postgraduate courses in the following subjects: "Dentistry for Children," by Carlos A. Criner and Francisco Leon Lara; "Legal Dentistry," by Jorge A. de Castroverde, and "Anthropology Applied to Dentistry," by Carlos Garcia Robión. The course on "Dentistry for Children" will last two weeks (July 5 to 17) with five hours daily work.—*Carlos A. Criner, D.D.S., Havana, Cuba.*

News From Chile

Leng Reports on U.S. Trip

Alfonso Leng, dean of the dental school of the College of Santiago, Chile, has published a series of articles of his impressions of the people and educational opportunities of the United States in a Santiago newspaper.

Dr. Leng, who is also a professor of periodontia and a music composer of world renown, traveled extensively in the United States last year at the invitation of the U.S. State Department.

He especially was impressed by the activities of the scientific laboratories and clinics and the universities and cultural centers of the United States. In order to learn the most recent trends, he visited a number of schools where laboratory research and clinic work in periodontia were being carried out.

In his newspaper articles, Dr. Leng also

thanked the government of the United States, as well as dental authorities and other friends, for making his stay in that country so profitable and unforgettable.

Announce Secretary's Resignation

Eduardo Feraro of Santiago recently resigned as the South American secretary of the Pan American Dental Association after serving in that position for eleven years.

Dr. Feraro, during his tenure of office, served to further international relations between dentists of Chile and the United States. He especially extended assistance and advice to dentists contemplating trips to the United States for the purpose of education.—*Raúl Munoz Inza, Londres 45, Santiago de Chile.*

News From Peru

On Friday, January 30, the new Board of Directors of the Academia de Estomatologia del Perú (Academy of Dentistry of Peru) for the year 1948-1949 was elected. Officers are as follows: president, Jorge Villanueva Meyer; vice-president, Manuel A. Ramirez Otárola; secretary, Benjamin Basauri; assistant secretary, Rómulo Hernández; treasurer, Carlos Cornejo E.; librarian, Juán F. Coz. Other members are Eduardo Aguila Pardo, Pedro Ayllón, Juán Otero, Ricardo Salazar and Federico Schuetz.

Dr. Meyer is a brilliant member of the Academy, with long experience in organizational work. He has been in charge of numerous and varied activities of the Academy, and the exceptional success of the first conference on oral hygiene was due, largely, to his efforts. As president of the seventeenth annual meeting he proved his ability as an organizer. These directive qualities united with his dental vocation will assure, beyond a doubt, that the term of the new president will be fruitful and will bring new progress to the Academy.—From *La Carta Odontologica,* of the Sociedad Peruana de Prótesis Dental y Máxilo-Facial.

News From Great Britain

Health Service Regulations

The National Health Service Regulations 1948 dealing with general dental service were made public on March 15. The dental associations have sent their members copies and advised them to study these regulations carefully.

They are in six parts and four schedules. Part 1, which deals with general matters, contains a definition of terms.

General Regulations.—Part 2 contains information regarding the provision of general dental services. It defines the responsibilities of the area Executive Council in preparing the list of dentists in the area from whom treatment under the scheme may be obtained. Copies of the list which contains the names, addresses and office hours of the dentists are to be hung in such places as post offices and public libraries.

Part 3 is concerned with the method of obtaining general dental services and is devoted to the position of the patient in the scheme. One of the conditions of obtaining treatment is that the patient shall, if required, submit himself for examination by one of the dental officers selected by the Dental Estimates Board.

This board is dealt with in part 4. The main function of the Dental Estimates Board will be to examine and approve estimates for dental treatment. The chairman of this board and six of the other eight members must be dentists.

The regulations governing special treatment and treatment necessitated by lack of care are set forth in part 5.

Part 6 details the transitional provisions for completion of treatment begun under the National Health Insurance plan which ends on July 4.

Terms of Service.—The first part of the first schedule concerns terms of service for dentists practicing elsewhere than at a health center. The dentist must have an adequately equipped surgery and waiting room. He must allow one of the appointed dental officers to inspect his office

on receipt of adequate notice. The practitioner must be prepared to visit a patient to give treatment if the condition demands it, provided that the patient is located within five miles of the office. The dentist must keep an adequate record of treatment on approved forms and must show them, on request, to appropriate officials. The state will pay the dentist for all treatment carried out under the service and, except in special cases provided for in the regulations, the dentist may not accept an additional fee from the patient. However, he may recover from a patient a reasonable fee for time lost when the patient fails to keep an appointment without an adequate excuse.

On accepting a patient for treatment the dentist shall complete and give to the patient a portion of the dental estimate form which states that he is willing to accept the patient for the treatment itemized on the form. He then examines the patient and completes the dental chart on the form. He lists all treatment which he considers necessary to render the patient dentally fit, and if the patient does not wish all the recommended treatment he also lists the treatment that the patient is willing to accept.

If none of the treatment desired by the patient requires prior approval, the practitioner may proceed at once and complete the treatment before sending the form to the Dental Estimates Board for authorization for payment. If the treatment acceptable to the patient contains one or more items that require prior approval, the form must be submitted within ten days of the examination for approval by the Dental Estimates Board. The dentist may proceed, however, to provide those services which do not come in the "prior approval" class. Any alteration or addition to the proposed treatment, once treatment has been started and approved, must be reported to the Board immediately if it is of the class requiring prior approval.

All treatments must be completed within a reasonable time, in most cases within six months. Treatment including extractions and the provision of dentures must be completed within twelve months from the time of approval. Provision is made for the inability or unwillingness of a practitioner to complete treatment. Under the regulations the dentist may supply and prescribe certain specified drugs.

If the dentist intends to be away from his office for more than three weeks he must notify his patients or the Executive Council, giving the name and address of his deputy to whom patients may apply for treatment. If he is to be absent for more than two months he must inform the Executive Council.

The second part of the first schedule deals with the terms of service in a health center.

Prior Approval of Treatment.—The second schedule enumerates the treatment which can be completed without obtaining prior approval of the Dental Estimates Board and those forms of treatment which require prior approval.

Treatment for which no prior approval is necessary comprise: (1) diagnosis—clinical examination and report, tentative treatment and dressings, roentgenologic examination costing less than two guineas, pathologic and bacteriologic examinations; (2) prophylaxis — normal scaling and gum treatment; (3) conservative treatment — fillings, root canal treatment; (4) extractions that do not necessitate the supplying of dentures; (5) general anesthesia — all forms; (6) emergency treatment—treatment for the relief of pain or other urgent symptoms; (7) repair of dentures—normal repairs.

The following items require prior approval before treatment may be started: (1) roentgenologic examination at a cost exceeding two guineas; (2) extensive or prolonged gum treatment including scaling, gingivectomy; (3) apicectomy; (4) repairs to expensive dentures when the cost exceeds the cost of corresponding repairs to plastic or vulcanite dentures; (5) furnishing of plastic or vulcanite dentures, obturators, special appliances, radium applications, splints; (6) all forms of orthodontic treatment; (7) removal of impacted teeth, retained roots and cysts, and treatment of fractured jaws.

All forms of oral surgery may be undertaken without prior approval if they are emergency treatment. Gold fillings, inlays, crowns and gold or other metal dentures may be provided free of cost to the patient only when, in the opinion of the Dental Estimates Board, they are required owing to the clinical condition of the patient.

Supplementary Payments.—If the patient wishes a more expensive form of treatment or appliance than the Dental Estimates Board believes necessary, a special form is completed and the Board will specify the amount that the State will pay and the additional amount that the dentist may charge the patient. This is not

grant-in-aid, of course, as the fees charged by the dentist are fixed by the Dental Estimates Board.

Dental Estimates Board

The following dentists have been appointed full time members of the Dental Estimates Board: W. L. Boness (chairman), V. W. Humpherson, Thomas Leaver, A. P. McClare and F. J. Marson. Kelsey Fry and Joseph Lauer are the two dental part time members.

The chairman formerly was vice-chairman of the Council of the British Dental Association.

News in Brief

The annual meeting of the British Dental Association will be held, under the presidency of P. G. Capon, at Liverpool from July 8 to 14.

Harry Stobie, dean of the Royal Dental Hospital of London and consulting dental surgeon to the Army in Britain during World War II, died in his home on April 28.

The new Sutherland Dental School and Newcastle Upon Tyne Dental Hospital was opened by the Minister of Health on May 29.

Maxwell Saunders, a final year student at Leeds Dental School, has been awarded a Henry Fellowship to enable him to undertake dental research at Harvard University for a year. This is the first time the award has been made to a dental student.

An exhibition of arts and crafts by dentists and their staffs was held at the headquarters of the British Dental Association from May 3 to 15.—*John Boyes, University of Durham, Newcastle Upon Tyne, England.*

News From India

The Dentists' Act of 1948, passed by the Parliament of the Union of India on February 26, 1948, brings India in line with other countries having similar dental acts.

The Act provides for the immediate establishment of registers for dentists, dental hygienists and dental mechanics. The Central Government of India will have complete jurisdiction over all the provinces and states of the country in seeing that the provisions of the Act are carried out.

The dentists' register is divided into two parts. Part A is for those persons who are qualified to practice dentistry on the basis of having been graduated from recognized dental schools in India or abroad. Part B is for those who are not qualified but can prove that they have been practicing dentistry for the past five years. These persons will be entitled to take a special examination to qualify them for part A of the register within a period of five years. After that time, part B of the register will cease to exist and only qualified dental surgeons will be entitled to register and practice in the Dominion.

With the passage of this legislation, no unregistered person shall be allowed to use the titles of dental surgeon, dental practitioner or surgeon dentist without being subject to a fine and imprisonment.

The Act also stipulates that only Indian citizens can register for dental practice in the Union until a scheme of reciprocity with foreign countries has been established.

The All-India Dental Association was responsible for the drafting of this Act. The association worked in close cooperation with the Central Government of the Union of India in an attempt to bring about the much needed and long overdue legislation.—*N. N. Bery, Honorary General Secretary, All-India Dental Association, New Delhi.*

CURRENT LITERATURE

Diseases of the Salivary Glands. A. C. Furstenberg, J.A.M.A. 136:1, January 3, 1948.

A discussion of the diseases of the parotid and submaxillary glands is presented, together with possible treatments. Foreign bodies, particularly the salivary calculus, are the chief factors responsible for inflammations of these glands. Methods of removal of such foreign bodies are described.

The common neoplasms of the salivary glands are mentioned also, and their removal by surgical intervention is discussed.—*George W. Burnett.*

Journal of Oral Surgery
July 1947

Titles marked with an asterisk are reviewed below.

***Prosthetic Restoration of Congenital and Acquired Deformities of Hard and Soft Palate.** V. H. Kazanjian, Boston.—181.

***Report of Ten Years' Experience in Treating Hypermobility of the Temporomandibular Joints.** Louis W. Schultz, Chicago.—202.

Postoperative Infection and Hemorrhage After Extraction of Third Molar. Frederick A. Henny, Detroit,—208.

***Acute Myelogenous Leukemia With Primary Oral Manifestations.** S. P. Mallett, H. P. Golan, L. C. England and J. H. Kutch, Boston.—209.

***Packing the Lateral Incisions in Cleft Palate Repair.** Harold I. Harris, Hollywood, Calif.—215.

***Extensive Dentigerous Cyst of the Maxilla With Intracystic Ameloblastic Papilloma.** G. Victor Boyko and A. M. Mohnac, Paterson, N. J.—217.

***Effect of Roentgenotherapy on Osteofibroma of the Maxilla.** Arthur M. Maris, Iowa City.—223.

***Metastatic Carcinoma of Mandible; Report of Case.** James R. Cameron and J. J. Stetzer, Jr., Philadelphia.—227.

***Immediate and Fatal Septicemia After Tooth Extraction.** W. T. Ewing, Akron, Ohio.—230.

Surgical Removal of Aberrant Teeth: Report of Two Cases. Charles McKenzie, Spokane, Wash., and D. H. Sharpless, Everett, Wash.—231.

Penicillin in the Treatment of Osteomyelitis: Report of Case. Alvin R. Hagstrom, Brooklyn.—235.

Compound Comminuted Fracture of the Mandible: Report of Case. H. N. Magee, Oklahoma City.—238.

Removal of Osteofibroma: Report of Case. John M. Marre, St. Louis.—241.

Removal of Impacted Third Molar From Antrum: Report of Case. Alvin L. Armer, Hollywood, Calif.—243.

***Treatment of Mandibular Fractures by External Fixation.** Robert M. Booth, Springfield, Ill.—245.

Temporomandibular Ankylosis: Report of Case. Philip M. Northrop, Ann Arbor, Mich.—256.

Complicated Fracture of the Mandible: Report of Case. R. B. Rode, St. Louis.—259.

***Roentgenotherapy of Maxillary Giant-Cell Tumor.** Paul H. Hamilton, Los Angeles.—261.

Prosthetic Restoration of Congenital and Acquired Deformities of Hard and Soft Palate. V. H. Kazanjian.

The author discusses certain surgical and prosthetic procedures in the repair and restoration of deformities of the palate and related parts. Emphasis is placed on the prosthetic problems of palatal defects. In cleft palate surgical repair there are failures and partial successes. It is these cases mainly that the author has selected to illustrate the types of prosthesis that may benefit the patient in appearance, speech and deglutition.

The success of the appliance used depends less on the design than on the accuracy of adaptation to the patient. In children where there is definite retrusion of the upper jaw caused by underdevelopment of the maxilla, intelligent orthodontic treatment is advised. In young adults with a similar deformity the construction of an appliance to provide fullness of the upper lip is recommended. It may be necessary to undermine the anterior surface of the anterior alveolar ridge and canine fossae and apply a skin graft to provide sufficient space for the denture.

For some patients with underdevelopment of the upper lip the Estlander-Abbe operation is recommended and described.

Ten cases are reported, with the type of deformity and the prescribed appliance illustrated and described. In three of the cases the appliance involved an obturator to provide closure

of the nasopharyngeal space. The obturators, which were individually adapted, are well illustrated and described.

Report of Ten Years' Experience in Treating Hypermobility of the Temporomandibular Joints. Louis W. Schultz.

The definition, etiology, symptoms and diagnosis of luxation and subluxation of the temporomandibular joint are enumerated and discussed.

In cases where there is acute pain and limited motion, injection treatments should be postponed and the joint put at rest until acute symptoms subside. Injection of the joint is contraindicated if both articular surfaces, that is, the head of the condyle and the glenoid fossa, are rough, painful and limited in motion and if there is no clicking or grating.

Schultz now uses Intracaine 5 per cent in oil or Eucupin 1 per cent in oil for the injection. Sodium psylliate, the drug formerly used, has been discarded because of its tendency to cause pain.

The method of injection is illustrated and described. It consists mainly of putting a few drops of the sclerosing agent into the cavities of both joints by the use of a 26 gage needle, 1½ inches long, and a 1 cc. tuberculin syringe. The needle is inserted into the joint cavity with the condyle out of the glenoid fossa or in the open-mouth position. Care must be taken not to inject within a blood vessel. Injection is made again in two or three weeks and is repeated until sufficient fibrous tissue has developed to effect a cure.

Acute Myelogenous Leukemia With Primary Oral Manifestations. S. P. Mallett, H. P. Golan, L. C. England and J. H. Kutch.

The authors report a case of acute myelogenous leukemia in a girl, aged 12 years, who first was seen with the complaint of bilateral pain in both the maxilla and mandible.

Oral examination revealed coated tongue, fetid breath and loose teeth, with extruded molars and bicuspids. The gingivae were hyperplastic, pale and necrotic at the margins. Other general physical signs were those peculiar to leukemia.

The progress and changing blood picture are well noted and illustrated.

Packing the Lateral Incisions in Cleft Palate Repair. Harold I. Harris.

The author recommends the use of the oxidized cellulose pack in cleft palate lateral incisions where a pack is indicated. Five advantages are listed: (1) it does not need to be removed, (2) it eliminates secondary bleeding, (3) it gives the same amount of immediate relaxation as do other packs, (4) it is not conducive to secondary infection and (5) it acts as a hemostatic agent.

Extensive Dentigerous Cyst of the Maxilla With Intracystic Ameloblastic Papilloma. G. Victor Boyko and A. M. Mohnac.

The authors report a case of an extensive cystic tumor involving the maxillary antrum of a girl, aged 17 years. Roentgenographic examination revealed a large cyst enclosing a molar tooth which was near the floor of the orbit. On removal of the cystic tumor, biopsy revealed many small cystic spaces and cells that resembled those of the enamel organ, and, although not typical, the tumor was believed to be an adamantinoma.

The authors stress the need for complete removal of dentigerous or follicular cysts which may show adamantoblastic elements.

Effect of Roentgenotherapy on Osteofibroma of the Maxilla. Arthur M. Maris.

Maris reports a case of localized osteitis fibrosa or ossifying fibroma which involved the maxilla in the region of the antrum. Biopsy showed fibroblasts, new bone formation and a few giant cells which appeared to be osteoclasts by their association with bony spicules. Blood chemistry and roentgenograms of other bones eliminated possibility of hyperparathyroid disease.

The patient received 900 roentgens on the lesion. Later 1,200 roentgens were directed to the parathyroid glands because of enlargement of the tumor, with the idea that this might be of value.

Postradiation roentgenograms made over a period of nine years show complete bony condensation of the tumor.

The author believes that roentgen rays in proper doses are indicated for treatment of certain lesions of this type.

Metastatic Carcinoma of Mandible: Report of Case. James R. Cameron and J. J. Stetzer.

A man, aged 64 years, first was seen in November 1935 when he complained of pain in a maxillary third molar region. Roentgenograms revealed an impacted mandibular third molar on the same side, and the tooth was removed because it was suspected of causing reflex pain in the maxilla.

Eighteen months previously the patient had had an embryonal carcinoma removed from a testicle. Five months after extraction of the tooth the patient returned with extensive destruction of the mandible on the same side. Biopsy revealed metastatic carcinoma. Operation was performed and the patient received roentgen therapy, but death occurred one month later.

Immediate and Fatal Septicemia After Tooth Extraction. W. T. Ewing.

In January 1942, a patient gave a history of localized infection of the lower right third molar of three days' duration. The temperature was normal, and the tooth was removed under nitrous oxide and oxygen anesthesia. The patient was admitted to the hospital that evening with a temperature of 102.9 F. and in acute distress. He received sulfathiazole and sulfanilamide and routine supportive treatment. Intraoral drainage was established and swelling subsided except for a large nodule anterior to the upper third of the anterior belly of the sternomastoid muscle. Blood cultures revealed Streptococcus viridans.

The patient succumbed from intraoral hemorrhage sixteen days after removal of the tooth. Ewing believes that if the abscess had been incised shortly after it appeared the termination of the case would have been different.

Treatment of Mandibular Fractures by External Fixation. Robert M. Booth.

The author illustrates the anatomy and describes the operation for reduction of mandibular fractures by external pin fixation. The latest pin designed can be placed in the bone with little pressure. It should engage the opposite cortical plate of bone but should not pierce the mucous membrane of the mouth. Electrolytic action between pins has been eliminated in the Stader splint by the use of plastic pin bars.

The author concludes that external fixation is not indicated for all fractures but is a successful method for treatment of fracture in selected cases. In mandibular resection, space maintenance and plastic surgery, external fixation proves to be the method of choice.

Roentgenotherapy of Maxillary Giant-Cell Tumor. Paul H. Hamilton.

A woman, aged 47 years, was found by biopsy to have a benign giant-cell tumor which involved the bone of an edentulous maxillary alveolar ridge. The tumor received fractional doses of roentgen rays, a total of 2,300 roentgens, over a period of two and a half months. A year and eight months after treatment there was no roentgenographic evidence of disease of the bone.—*H. L. Hubinger.*

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Titles marked with an asterisk are reviewed below.

The Editor's Viewpoint.—397.

Penicillin Sensitivity of Streptococci Isolated From Root Canal Infections and the Normal Mouth. Mary C. Crowley and Verna Harner, University of Michigan.—399.

***A Clinical Study of the Treatment of Root Canal and Periapical Infections With Penicillin.** F. D. Ostrander, Mary C. Crowley and John Dowson, University of Michigan.—403.

***Some Observations on the Association of the Products of Protein Putrefaction With Dental Caries Activity.** Samuel Dreizen and T. D. Spies, Hillman Hospital, Birmingham, Ala., and University of Cincinnati.—409.

Adaptability of the Periodontal Membrane. M. S. Aisenberg, University of Maryland.—421.

***Transparency and Light Scattering of Dental Hard Tissues.** R. S. Manly and Eleanor J. Simmons Brooks, University of Rochester.—427.

International Association for Dental Research. Proceedings of the Twenty-fifth General Meeting, June 21-22, 1947. Compiled by H. B. G. Robinson, Ohio State University.—435.

A Clinical Study of the Treatment of Root Canal and Periapical Infections With Penicillin. F. D. Ostrander, Mary C. Crowley and John Dowson.

A clinical study of the effectiveness of penicillin in root canal therapy was correlated with a laboratory study of the penicillin sensitivity of micro-organisms isolated from root

canal and periapical infections. In the latter study 89.1 per cent of the Streptococcus viridans strains were found to be penicillin-sensitive, but only 12.5 per cent of the Streptococcus anhemolyticus strains proved to be sensitive. The clinical results followed the same pattern in that 70.58 per cent of the Streptococcus viridans infections readily yielded to topical penicillin therapy whereas only 38.88 per cent of the Streptococcus anhemolyticus infections responded.

Although results with penicillin were good when the invading organisms were penicillin-sensitive, the over-all clinical results with penicillin were distinctly inferior to results obtained when control groups were treated with other commonly used root canal antiseptics.

Some Observations on the Association of the Products of Protein Putrefaction With Dental Caries Activity. Samuel Dreizen and T. D. Spies.

The susceptibility of endemic pellagrins to periodontal disease and their relative immunity to dental caries have been reported from different parts of the world. The lowered caries incidence cannot be explained wholly on the basis of diet, oral hygiene, fluorine or lack of the nutritional requirements of the Lactobacillus acidophilus. Dental caries is primarily the result of the breakdown of carbohydrates, which is acid-producing in nature, whereas periodontal disease involves the production of toxic products which are alkaline in effect. The possible antithetic nature of the processes of dental caries and of gross periodontal disease suggested that the products produced during the breakdown of tissue protein may in some way affect the development of dental caries. Since indole production has been correlated with the severity of periodontal disease, it was decided to determine whether indole and its related compound, indole-3-acetic acid, both of which are produced during the bacterial decomposition of tryptophane, possess properties as inhibitors of acid production in saliva.

The methods employed were the Fosdick, Hansen and Epple test for dental caries activity and the addition of various amounts of indole and indole-3-acetic acid to yeast extract dextrose broth inoculated with a pure culture of Lactobacillus acidophilus (Hadley) recovered from a carious lesion. Indole in amounts of 7.5 or 10 mg. or indole-3-acetic acid in 10 mg. quantities partially or completely inhibited acid production *in vitro* in 10 cc. samples of saliva from 50 of the 51 patients studied. Either compound inhibited the growth and acid production of the Lactobacillus acidophilus (Hadley) partially or completely when added in concentrations ranging from 2.5 to 6.0 mg. for indole and 5.0 to 7.5 mg. for indole-3-acetic acid. The findings offer a working hypothesis that the products of protein putrefaction may be responsible to some extent for the decreased incidence of dental caries accompanied by extensive periodontal disease which is often seen in endemic pellagrins and persons with chronic vitamin B complex deficiencies.

Transparency and Light Scattering of Dental Hard Tissues. R. S. Manly and Eleanor J. Simmons Brooks.

Measurements of the transparency of different regions of moist tooth sections were made by means of a photoelectric cell fastened on the ocular lens of a microscope. The changes in transparency were observed after drying and after immersing the sections in liquids with known refractive indices. Average values and normal variations are reported for light transmission by several different regions of dental hard tissues. Transparency of dentin was not correlated with the percentage of moisture or ash. The transparency of normal dentin was dependent on the refractive index of the media filling the tubules and was greatest when the refractive indices of the tubules and matrix were the same (1:56); dentin modifications which had become transparent in the mouth were similarly affected but to a lesser degree. The findings support the hypothesis that dentin becomes transparent *in vivo* because of calcific deposits within the tubules and that the deposits resemble cementum in their degree of calcification.

COMMITTEE ON DENTAL ECONOMICS

THE REVENUE ACT OF 1948: A SUMMARY OF MAJOR REVISIONS

THE Revenue Act of 1948, enacted April 2, provides for substantial individual income tax relief for the year 1948. Numerous opportunities for savings in gift and estate taxes also are incorporated in the Act, gift tax provisions being effective as of April 3, 1948, and estate tax changes as of January 1, 1948. The purpose of this article is to summarize the major revisions included in the new law.

Income Tax Changes

The individual taxpayer will receive benefits derived from the following changes in the law:

1. An increase in the credits for personal exemptions.
2. A reduction in net tax rates.
3. Permission for a husband and wife in all states to report their combined net income and exemptions on a joint return and compute the tax at twice the tax computed on half of their total net income less half of the total exemptions.

Personal Exemptions. — Personal exemptions have been increased from $500 to $600. The Act also provides an additional $600 exemption for a person who is 65 years old or more on the last day of the year, and a like exemption for husband or wife 65 or more, if a joint return is filed. An additional exemption is not allowed for other dependents 65 years or older.

There has been no change in the definition of a dependent, which permits an exemption only when a dependent's gross income for the year is less than $500.

Tax Rates.—There has been no revision in the combined normal tax and surtax rates as used on the 1947 return. The reduction is effected by increasing the percentage to be deducted from the tentative normal tax and surtax. This reduction was 5 per cent for 1947. The 1948 Act provides for a reduction of 17 per cent on the first $400 of tentative tax, 12 per cent on tentative taxes over $400 and under $100,000 and 9.75 per cent on the amount in excess of $100,000.

Joint Returns for Husband and Wife.— The 1948 Act permits a husband and wife in all states to split their total income for tax purposes, a privilege which previously was available only to taxpayers residing in fourteen states with community tax laws. The saving to married couples living in states without community tax laws will, in many instances, be substantial. Sample comparisons are shown in Table 1.

The tax benefits of splitting income can be secured only by filing a joint return. A joint return may be filed by any person who is married on the last day of

the taxable year even though one of the couple may have no gross income or deductions. The husband and wife must have the same taxable year.

The tax on a joint return is computed as follows:

1. The net income of husband and wife is determined by combining the gross income of each and deducting therefrom all allowable deductions.

2. The net income is divided by two and further reduced by one-half of the combined exemptions.

3. The tax is calculated on half of the net income less half of the combined exemptions.

4. The calculated tax is then multiplied by two to determine the total tax payable.

Tax Savings for Single Persons.—The tax saving to single persons in the higher income brackets is substantially less than to married persons who may split income on a joint return. A single person received only the benefit of the increase in exemption allowances and the reduction in rates. Sample comparisons are shown in Table 2.

Standard Deductions.—The new law makes no change in the deductions allowable for purposes of tax, but additional benefits have been granted in the use of the standard deduction.

Table 1.—Comparison of 1947 and 1948 taxes for a married man less than 65 years of age having two children. It is assumed that the entire income in both years is earned by the husband and split on a joint return

Net income	Tax—1947	Tax—1948	Tax saving
$ 5,000	$ 589.00	$ 431.60	$ 157.40
10,000	1,862.00	1,360.96	501.04
15,000	3,638.50	2,512.00	1,126.50
20,000	5,890.00	3,888.32	2,001.68
25,000	8,521.50	5,475.84	3,045.66
50,000	24,111.00	16,577.92	7,533.08
100,000	62,301.00	45,642.56	16,658.44

Table 2.—Comparison of 1947 and 1948 taxes for a single person without dependents

Net income	Tax—1947	Tax—1948	Tax saving
$ 5,000	$ 921.50	$ 810.72	$ 110.78
10,000	2,346.50	2,123.68	222.82
15,000	4,270.25	3,894.24	376.01
20,000	6,645.25	6,088.96	556.29
25,000	9,362.25	8,600.48	761.77
50,000	25,137.00	23,201.44	1,935.56
100,000	63,540.75	58,762.24	4,778.51

The old law limited to $500 the standard deduction on a joint return showing adjusted gross income in excess of $5,000. The present law provides for a standard deduction of $1,000 or 10 per cent of the adjusted gross income, whichever is lesser, on a joint return having adjusted gross income of $5,000 or more. A single person may now take a standard deduction of 10 per cent of adjusted gross income but not more than $1,000. The maximum standard deduction under the prior law was $500. If separate returns are filed by married persons the maximum standard deduction remains at $500 each.

Medical and Dental Expenses.—The deduction for medical and dental expenses to the extent they exceed 5 per cent of the taxpayer's adjusted gross income remains the same in the new law. The maximum deduction has been increased from $2,500 for a married couple filing a joint return to $5,000, if the couple have two or more dependents. A married couple with one dependent (three exemptions) is allowed $1,250 for each exemption, or $3,750 and with four or more exemptions an additional $1,250 to bring the maximum allowance to $5,000.

Although in most cases it will prove advantageous for husband and wife to file a joint return there may be instances where the filing of individual returns will result in tax saving. Medical and

dental expense deductions in the case of a joint return are based on 5 per cent of the combined adjusted gross income. Certain divisions of net income between husband and wife combined with heavy medical and dental expenses would result in utilization of the expense deduction to a greater tax advantage through the filing of individual returns.

Capital Gains and Losses. — There has been no change in the law pertaining to capital gains and losses which for a number of years has limited the tax on a net long-term capital gain (assets held more than six months) to 25 per cent of the gain. The taxpayer previously received the benefit of this alternative rate when net income less exemptions exceeded $18,000. This advantage has been lessened under the new law because of the reduction in rates and the provision for splitting income on joint returns. No benefit is received now from the 25 per cent limitation until net income less exemptions exceeds $22,000 on individual returns, and $44,000 on joint returns.

Amending Estimated Tax.—Declarations of estimated tax for 1948 which were filed as of March 15, based on the provisions of the old law, should have been amended as of June 15 to take advantage of the tax saving permitted by the 1948 Act. Thus the tax installment payable June 15 would have equalled 50 per cent of the total 1948 tax estimated under the provisions of the new law less the initial payment made March 15. The remaining 50 per cent will be due September 15, 1948, and January 15, 1949, as in previous years. The declaration can, if necessary, again be amended on those dates.

Estate and Gift Tax Changes

The Revenue Act of 1948 radically revised the federal estate and gift tax law although these changes were little publicized while the legislation was being considered by Congress. The primary changes, as in the case of the income tax law, result from the application of the community property principle. The tax rates remain the same.

The gift tax law now provides that only 50 per cent of the amount of a gift made from husband to wife, or vice versa, is taxable; likewise a gift by either husband or wife to a third party if consent of the other is given. The law thus permits tax free gifts between husband and wife, or from either to a third party, to the extent of $6,000 a year instead of the $3,000 exemption allowed under the prior law. The lifetime gift tax exemption, in addition to the annual exemptions, can, if not already used, be increased from $30,000 to $60,000, which materially reduces the gift tax on transfers during life and also on estate taxes.

The revision of the estate tax allows a deduction of half of the value of the gross estate, less allowable deductions, passing to husband or wife at time of death. This reduces the taxable estate and also results in a lower rate of tax. The deduction also applies to property left in trust for the surviving spouse if full power is granted to appoint the principal.

The changes in the estate and gift tax laws make it imperative to review, with qualified legal counsel, the tax advantages to be gained or the necessity for changes in previously executed wills, estate plans and gift programs.

GENERAL ANESTHESIA IN DENTISTRY: QUESTIONS AND ANSWERS

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THIS is one in a series of questions and answers papers which are prepared by qualified experts at the request of the Council on Dental Therapeutics. The opinions expressed are those of the author and do not necessarily reflect the opinions of the Council. Other papers in preparation deal with prescription writing, disinfection of dental instruments and the technic of local anesthesia.

The administration of general anesthetic agents by the average dentist in his office is a procedure fraught with many dangers. There can be no doubt that specialized training in anesthesia would improve the care of patients. Nevertheless, facing reality, it is apparent that thousands of rather inadequately trained practitioners are giving general anesthesia by necessity. Certain problems can be anticipated under these circumstances. The following questions and answers have been composed with this in mind.

Q. Should all patients who require surgical intervention with general anesthesia have a thorough physical examination immediately before the operation?

A. At some time prior to the operation there should be an evaluation of the physical status of the patient by a competent physician. This should be supplemented by a common-sense appraisal by the dental surgeon of the immediate preoperative condition of the patient, from the point of view of such obvious abnormalities as dyspnea, cyanosis, anginal pain, and edema of the ankles. Blood pressure and vital capacity likewise can be evaluated in the office. In general, a more thorough study should be made of patients in the older age groups, since degenerative diseases are more common in these individuals.

Q. Prior to the administration of the general anesthetic agent, certain drugs may be given. What are these substances and what is the value of this premedication?

A. Two types of drugs are useful; central nervous system depressants (usually barbiturates in the outpatient department), and drugs which block secretion from glands in the respiratory tract and from salivary glands (usually atropine sulfate). For an average man weighing 150 pounds, pentobarbital sodium or Seconal sodium in doses of 0.1 to 0.2 Gm. can be administered together with atropine sulfate 0.4 mg. by mouth, forty-five minutes prior to induction of anesthesia. This should be given at the office.

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The barbiturates will decrease the excitement stage, minimize the amount of anesthetic required, and prior to nitrous oxide-oxygen anesthesia will reduce the metabolism of the patient to such a degree that this relatively weak agent can be used without danger of anoxia.

Atropine sulfate minimizes secretions of the respiratory tract and decreases the incidence of spasm of the vocal cords.

Q. 1. If premedication is used to supplement the anesthetic agent and the patient remains until the effects are minimal, would this not be a serious objection for a dental office practice?

2. What instructions should the patient be given concerning preoperative preparation?

A. 1. No; if general anesthesia is utilized, adequate facilities for recovery of the patient should be available. The patient should remain in the office for an hour after the operation. This would be at least two hours after administration of premedication. He must be accompanied home by a responsible adult.

2. The patient should be instructed to take nothing by mouth for four hours before the time of the appointment. Prior to induction of anesthesia, the patient should empty the bladder. Tight clothing should be loosened and makeup must be removed.

Q. Is it possible to anesthetize a patient with nitrous oxide without bringing about anoxemia?

A. The easiest means of delivering adequate oxygen in nitrous oxide anesthesia, without unduly decreasing the narcosis, is by use of synergistic agents. These augment the low potency of nitrous oxide and allow an increase in oxygen percentage to a reasonable amount. The synergistic agents most commonly used are the barbiturates and vinyl ether. The barbiturates are given as premedication with atropine sulfate forty-five minutes before induction of anesthesia. Vinyl ether is placed directly in the vaporizer bottle of the anesthetic machine and added to the nitrous oxide-oxygen mixture during narcosis.

Q. If premedication is given, can thiopental sodium be used as an anesthetic agent for the ambulatory patient?

A. Unless one has all the facilities at his disposal for the treatment of narcosis caused by thiopental sodium, and a trained anesthetist to administer the drug, it would be a hazardous procedure.

The signs of anesthesia with thiopental sodium are not as well demarcated as with other agents. The excitement stage is eliminated because of the rapidity of its action. There is a tendency toward cumulative action, and laryngospasm may complicate the anesthesia. Complete destruction of the agent and detoxification may not take place for several hours, and the patient must be watched carefully after cessation of anesthesia.

Q. Is it best to insert the mouth prop and oral-pharyngeal partition prior to anesthesia, so that less time will be consumed during surgical anesthesia?

A. The mouth prop or gag should always be inserted before anesthesia. Insufficient relaxation in the early stages of anesthesia with nitrous oxide may make it difficult to open the mouth and insert the gag. A vomiting reflex occurring prior to insertion of the mouth gag could lead to serious consequences.

The oral-pharyngeal partition should be placed in proper position only after the patient is anesthetized. Premature placing of this gauze partition between the oral cavity and the pharynx will stimulate coughing and vomiting reflexes.

It is absolutely necessary that these two steps be accomplished properly. The

mouth gag insures quick access to the patient's airway at all times during induction and maintenance of anesthesia, thus enabling the operator to secure adequate ventilation.

The proper positioning of the oral-pharyngeal partition between the two tonsillar pillars laterally and the base of the tongue and the posterior border of the hard palate medially, will diminish dilution of the anesthetic gases and prevent inspiration of blood, tooth fragments and other debris from the site of operation.

Q. If the nosepiece is used for induction without an oral mask, can sufficient gas be administered to induce surgical anesthesia?

A. Most anesthesia machines used in dentistry have devices for administering gases under positive pressure. These can be adjusted in millimeters of mercury above atmospheric pressure. Two to eight millimeters of mercury pressure usually will suffice. Greater pressures not only waste gases but are positively detrimental since they decrease the flow of blood through the lungs. The recommended pressure will prevent much dilution of the gases by air entering through the oral cavity. A damp towel should be placed over the mouth, if the oral mask is not used, to reduce further the amount of inspired air.

Q. Which patients are the most difficult to anesthetize?

A. (1) Well developed and muscular adults, (2) alcoholic individuals and (3) those who have definite tendencies toward mouth breathing. The muscular type of patient can resist narcosis to a considerable extent and will demonstrate a prolonged excitement stage. The alcoholic patient already has developed some tolerance toward narcosis and likewise will prove troublesome. Asphyxia may be a problem unless the patient is well sedated prior to induction and vinyl ether is added to the nitrous oxide-oxygen mixture.

The third group usually presents some nasopharyngeal narrowing or obstruction which forces them to resort to mouth breathing. Deviations of the nasal septum or constrictions in the airway can be discovered by breathing tests. If a general anesthetic agent is selected, induction with a full face mask and then intubation with a small bore nasopharyngeal tube on the side which is more patent, can be employed on most of these patients.

Q. If danger of anoxia constitutes an objection to nitrous oxide-oxygen anesthesia, why couldn't vinyl ether be used entirely for dental operations?

A. Vinyl ether administered by the open drop method is most acceptable for use with children. The early analgesia, quick induction and normal oxygen content of atmospheric air make it suitable for dental surgery.

Adults are difficult to anesthetize with vinyl ether by the open drop method because of the irritating effects of this volatile agent. Combined with nitrous oxide and oxygen in the anesthetic machine, it is an excellent synergist.

Q. When should vinyl ether be added to the nitrous oxide-oxygen mixture during anesthesia?

A. It is best to obtain induction with nitrous oxide-oxygen and add the vinyl ether as the pharyngeal reflexes are diminished by the nitrous oxide. This eliminates much of the coughing and gagging so commonly seen.

Q. How long can a patient be anesthetized safely in a dental office?

A. It is best to plan operations which will not require more than ten minutes. The length of time necessary for re-

covery from anesthesia is directly dependent on the agents used, the premedication, and the time and depth of narcosis. A patient may require half a day for complete recovery if barbiturates are used preoperatively and extensive surgical procedures are attempted with profound nitrous oxide-vinyl ether narcosis.

Q. Under what conditions can anoxia occur when vinyl ether is used by the open drop method?

A. Anoxia is apt to occur during the induction phase. Too rapid flow of this irritating, volatile liquid over the gauze face mask may precipitate violent pharyngeal reflexes. These may increase the flow of mucus from the respiratory tract and lessen the respiratory volume. Naturally this condition can occur also at a deep level of narcosis, as the rate and depth of respirations are decreased and respiratory effort is gradually eliminated.

Q. If anoxia occurs during the induction phase and cyanosis is evident, what should be done?

A. The placing of the mouth gag in position prior to anesthesia makes the situation somewhat easier to remedy. Excessive mucous secretions should be removed with an aspirating tip or large gauze sponges. With a patent airway provided by elevating the mandible and its associated soft structures, oxygen can be administered under low positive pressure (2 to 4 mm. of mercury). Administration of the anesthetic agent is discontinued until the situation is remedied.

Q. Ethyl chloride has been used for many years as a dental anesthetic. Is this agent more effective than vinyl ether for children?

A. There is no doubt that ethyl chloride can be used to great advantage for short dental operations. Analgesia is obtained quickly and the patient reaches surgical anesthesia with little evidence of the excitement stage. However, narcosis continues to deepen after administration of the agent has ceased, owing to the cumulative action of the drug, and one should be thoroughly familiar with its use to avoid overdosage.

Vinyl ether is more easily controlled, and if not added too rapidly it will give good analgesia and anesthesia with a greater margin of safety than ethyl chloride.

Q. Does ethylene have any advantage over nitrous oxide as an anesthetic agent?

A. No. The potency of ethylene is practically that of nitrous oxide. The benefits of ethylene are insignificant as compared to its additional hazards (explosions) and objectionable odor.

Q. What means can be utilized to combat a state of general collapse (shock) during or immediately after anesthesia?

A. Any patient showing the symptoms of general collapse should receive prompt treatment and the operation should be discontinued immediately. These patients must be treated symptomatically. The usual manifestations are an ashen pallor, thready pulse, profuse sweating, lowered body temperature and a drop in systolic blood pressure.

Oxygen by inhalation and certain agents by intramuscular injection may help to support failing circulation. Ephedrine sulfate, 50 mg. will increase cardiac rate and output, thereby elevating blood pressure. This useful agent also may act as a respiratory stimulant. The body temperature should be maintained by blankets and heating pads. The period of shock will last for a considerable time and the patient should

remain in a supine position until recovery is complete.

Q. What other therapeutic agents are useful for combating depression during general anesthesia?

A. Caffeine sodiobenzoate, 0.5 to 1.0 Gm. is a stimulant of some value for treatment of respiratory depression. Pentamethylenetetrazol, 100 mg. by intramuscular injection, may be used effectively against respiratory depression, but is of no value as a cardiac stimulant.

Nikethamide, in doses of 2 to 3 cc. of 25 per cent solution, has value in respiratory depression but is of little value as a cardiac stimulant. — *255 South Seventeenth Street.*

REPORT OF THE ANNUAL MEETING OF THE COUNCIL ON DENTAL THERAPEUTICS

EACH year, usually in March or April, the members of the Council on Dental Therapeutics meet in Chicago to discuss developments in the field of therapeutics, to revise and formulate their general policy and to plan for the future. The routine deliberations of the Council are conducted through a monthly confidential mimeographed bulletin which is prepared under the direction of the secretary of the Council and mailed to the members of the Council and to certain consultants and officers of the American Dental Association. The 1948 meeting of the Council was held on March 26 and 27.

Revision of Rules

For some time it has been apparent to the members of the Council that some new therapeutic products and preparations which have become established as useful in dental practice through extended clinical experience have not been adequately covered by rules which govern the Council in its consideration of products.[1]

1. *A.D.R.*, ed. 13, p. 236.

The Council voted that new therapeutic products which meet reasonable standards of safety when used according to directions be accepted for clinical trial subject to consideration in accordance with the usual procedures, provided the available evidence indicates that they are potentially useful in dentistry. Old products for which new evidence of usefulness appears will be considered as new products. Such products will not be permitted to bear the Seal of Acceptance, and all labels and advertisements must bear a suitable explanatory statement.

Products which are accepted for clinical trial will be re-examined annually. They will be granted full acceptance when they have been established as useful in dental practice, provided they continue to be marketed in accordance with the rules of the Council. If experience indicates that they are not useful, or that they are not as safe as they were originally thought to be, they will be declared unacceptable.

Several established products which meet reasonable standards of safety and usefulness will be made eligible for ac-

ceptance by new interpretations of those portions of the rules which relate to scientific evidence and the composition of mixtures. The Council voted to utilize extended clinical experience as evidence in its consideration of such products for acceptance.

The Council will consider for acceptance mixtures of vitamins provided evidence adequate to justify the proportions of the ingredients is available. It will also consider for acceptance all mixtures which meet reasonable standards of safety and effectiveness provided claims are not made for ingredients which have not been shown to be useful. It is hoped that this latter provision will eliminate much controversy concerning the acceptability of certain products which contain ingredients that have not been shown to be useful. These preparations are relatively few in number but application of the former rules of the Council to them has been followed by misunderstanding in some instances in the past.

Status of Sulfonamides

The Council reviewed its policies with regard to the topical use of sulfonamides in the light of the scientific evidence which has accumulated during the past year. The action of the Council on Pharmacy and Chemistry of the American Medical Association in dropping all topical sulfonamides from its list of accepted remedies was taken into consideration.[2] The policy of the Council on Dental Therapeutics with reference to use of sulfonamides has been quite conservative.[3] It was decided that no change in the status of topical sulfonamides in dental practice was warranted at this time.

The high incidence of unfavorable reactions to sulfathiazole was discussed and it was decided not to consider brands of this substance for acceptance and to add a warning statement to its description in *Accepted Dental Remedies*.

Therapeutic Investigations

The Council is conducting a long-term study of the prevalence, causes and possible methods for prevention or treatment of occupational dermatitis among dentists.[4,5] The study is now in the survey stage. The Council has the names and addresses of approximately six hundred dentists who are hypersensitive to one or more items connected with their daily work. Evidence which has been accumulated thus far indicates that at least three times this number may actually be hypersensitive. The Council therefore urges all affected dentists who have not already written in to do so in order that they may cooperate in the study. The Council received a progress report of the study on occupational dermatitis and voted that a preliminary report be published in order to encourage more widespread participation.

There appears to be no clear-cut correlation between the number of years of dental practice and the appearance of symptoms of hypersensitivity in the data compiled thus far. The condition may appear at any age and its severity differs greatly among individuals.

The most common cause seems to be local anesthetics. Frequent washing of the hands, contact with acrylic liquids and other dental materials and with chemicals used in the disinfection of dental instruments are among the other causes most frequently cited. About a fifth of those who reported stated that they have obtained complete relief from

2. Sulfonamides for Local Application Deleted from N.N.R. *J.A.M.A.* 137:157 (September) 1947.
3. *A.D.R.*, ed. 13, p. 122.
4. Wanted: A Rational Treatment for Procaine HCl Dermatitis. Editorial. *J.A.D.A.* 35:649 (November 1) 1947.
5. Council to Investigate Occupational Dermatitis. *J.A.D.A.* 35:677 (November 1) 1947.

symptoms by avoiding the offending agent or by treatment. A considerable proportion stated that they could get along if they used rubber gloves or finger cots, but most have found only partial relief.

When it has accumulated as much information as possible from the members of the dental profession, the Council plans to enlist the cooperation of one or more groups of investigators to formulate practical suggestions which can be made with a view to eliminating occupational dermatitis among dentists insofar as possible. In order to accomplish this, it probably will be necessary to study intensively a representative group of individuals who suffer from occupational dermatitis, perhaps in some of the more densely populated areas where a large number of dentists can be examined without undue inconvenience.

It is possible that the increased use of certain types of drugs, chemicals and materials and the increased volume of work by dentists during recent years may have contributed to an increase in the incidence of dermatitis.

Progress reports on the following therapeutic investigations which are being supported by funds from the American Dental Association under the sponsorship of the Council were received:

The Mechanism of Hypersensitive Dentine and Innervation of Dentine: Arthur B. Gabel, Darby professor of operative dentistry, Thomas W. Evans Museum and Dental Institute, School of Dentistry, University of Pennsylvania, Philadelphia.

Desensitizing Agents for Sensitive Necks of Teeth: Robert G. Kesel, professor of applied materia medica and therapeutics and head of the department, University of Illinois, College of Dentistry, Chicago.

A Study of Factors Involved in the Healing of Fractures: W. D. Armstrong, Director, Laboratory of Dental Research, University of Minnesota, Minneapolis.

Local Anesthetics

The Bureau of Chemistry reported on new specifications for local anesthetics intended for parenteral injection. Most of these products are not covered adequately by official standards. The cooperation of the manufacturers has been obtained and it is planned to complete in the near future the preparation of specifications adequate to cover those products which are now on the market.

Accepted Dental Remedies

The Council voted to add descriptions of the following preparations to *A.D.R.:* Thiopental sodium, mastic, copal, dibasic ammonium phosphate, urea, bentonite.

In view of the lack of evidence to justify their continued use in dentistry, it was voted to delete from *A.D.R.* the descriptions of benzoic acid, aluminum acetate, aluminum acetate solution and aluminum subacetate solution.

A new design and typographic format for *A.D.R.* was discussed.

New Bylaws

The Council considered those portions of the new bylaws which relate to its activities and voted to send suitable suggestions to the Committee on Constitutional and Administrative Bylaws.

Election

Harry Lyons was elected vice-chairman of the Council on Dental Therapeutics.

COUNCIL ANNOUNCES ACCEPTANCE OF FOUR PER CENT PROCAINE SOLUTIONS FOR LIMITED USE IN DENTISTRY

For several years, some manufacturers of local anesthetics have marketed 4 per cent procaine solutions for use in dentistry. In a previous report[1] the Council pointed out that there might be occasional instances in the practice of dentistry in which a local anesthetic solution more potent than 2 per cent procaine would be desirable. However, at that time 4 per cent procaine frequently was advertised for routine use, and the Council pointed out that there were potential dangers in such use. Doubling the conventional concentration of procaine obviously increases the danger of untoward reactions, and therefore the Council continues to advise against the routine use of 4 per cent procaine.

More recently several of the firms marketing 4 per cent procaine expressed a willingness to advertise this product for use only in those cases in which satisfactory anesthesia is not obtainable with the usual 2 per cent solutions, and announcement of acceptance of several brands of 4 per cent procaine follows. One of the provisions for Council acceptance of 4 per cent procaine solutions is that each package must bear the following warning statement or its equivalent: "The concentration of anesthetic agent in this product is greater than that required for routine use. Use only where anesthesia is difficult to obtain."

Thus the Council's acceptance of 4 per cent procaine in no way constitutes a recommendation of it for routine use. If it is used only when anesthesia is difficult to obtain, 4 per cent procaine will serve a useful purpose in dentistry, but widespread routine use might result in an unnecessary increase in untoward reactions due to local anesthetic injections.

Negotiations are in progress with other firms marketing 4 per cent procaine solutions, and it is hoped that further brands will be added to the accepted list in the near future.

Procaine HCl 4%, Neo-Synephrine HCl 1:2500—Anestex: Each cubic centimeter is stated to contain procaine HCl, 0.04 Gm.; neo-synephrine HCl, 0.0004 Gm.; chlorobutanol (chloroform derivative), 0.005 Gm.; sodium chloride, 0.0005 Gm.; potassium sulfate, 0.003 Gm.; sodium thiosulfate (anhydrous), 0.001 Gm.; sodium bisulfite, less than 0.00067 Gm.; in distilled water. Marketed in Injectubes, 2.4 cc. Manufactured by Anestex Laboratories, Pittsburgh.

Procaine HCl 4%, Neo-Synephrine HCl 1:2500—Durst: Each cubic centimeter is stated to contain procaine HCl, 0.04 Gm.; neo-synephrine HCl, 0.0004 Gm.; sodium chloride, 0.005 Gm.; sodium bisulfite, 0.0019 Gm.; in distilled water. Marketed in cartridges, 2.3 cc. Manufactured by S. F. Durst & Co., Philadelphia.

Procaine HCl 4%, Neo-Synephrine HCl 1:2500—Neo-Quest: Each cubic centimeter is stated to contain procaine HCl, 0.04 Gm.; neo-synephrine HCl, 0.0004 Gm.; sodium chloride, 0.005 Gm.; sodium bisulfite, 0.0019 Gm.; in distilled water. Marketed in tubes, 2.2

1. Four Per Cent Procaine Solutions—Not Acceptable for A.D.R. *J.A.D.A.* 31:278 (February 1) 1944.

cc. Manufactured by Neo-Quest Chemical Company, Inc., Philadelphia.

Procaine HCl 4%, Neo-Synephrine HCl 1:2500—Oradent: Each cubic centimeter is stated to contain procaine HCl, 0.04 Gm.; neo-synephrine HCl, 0.0004 Gm.; sodium chloride, 0.0045 Gm.; sodium bisulfite, 0.002 Gm.; in distilled water. Marketed in cartridges, approximately 2.3 cc. Manufactured by the Oradent Chemical Company, division of Mizzy, Inc., New York.

Procaine HCl 4%, Neo-Synephrine HCl 1:3500—"Oryl" Brand: Each cubic centimeter is stated to contain procaine HCl, 0.04 Gm.; neo-synephrine HCl, 0.000285 Gm.; sodium chloride, 0.002 Gm.; sodium bisulfite, 0.0018 Gm.; chlorobutanol, 0.005 Gm.; in distilled water. Marketed in tubes, 2.2 cc. Manufactured by Exodontia Products Co., Chicago. Distributed by the Wm. Getz Corporation, Chicago.

Procaine HCl 4%, Neo-Synephrine HCl 1:3500—Exodontia: Each cubic centimeter is stated to contain procaine HCl, 0.04 Gm.; neo-synephrine HCl, 0.000285 Gm.; sodium chloride, 0.002 Gm.; sodium bisulfite, 0.0018 Gm.; chlorobutanol, 0.005 Gm.; in distilled water. Marketed in tubes, 2.2 cc. Manufactured by Exodontia Products Co., Chicago.

COUNCIL LISTS PRODUCTS FOR "ACCEPTED DENTAL REMEDIES"

THE Council on Dental Therapeutics of the American Dental Association announces the inclusion of the following products in the list of *Accepted Dental Remedies:*

Penicillin and Streptomycin[1]

Penicillin Troches - Novol: Each troche is stated to contain 5,000 units of crystalline sodium penicillin together with gelatin, corn starch, sugar, colors and flavor. Manufactured by Novocol Chemical Mfg. Co., Inc., Brooklyn.

Penicillin Troches - C. S. C.: Each troche is stated to contain 5,000 units of crystalline potassium penicillin together with gelatin, sucrose, dextrin, magnesium stearate and flavor. Manufactured by C.S.C. Pharmaceuticals, A Division of Commercial Solvents Corporation, Terre Haute, Ind.

Penicillin Troches - Bristol: Each troche is stated to contain 5,000 units of crystalline sodium penicillin G, together with sugar, precipitated chalk, talc, magnesium stearate and flavor. Manufactured by Bristol Laboratories, Syracuse, N. Y.

Penicillin Troches - Abbott: Each troche is stated to contain 5,000 units of penicillin calcium, together with tragacanth, acacia, sodium carboxymethylcellulose, sugar, magnesium stearate and flavor.

Buffered Tablets Penicillin Calcium, 50,000 Units: Stated to contain penicillin calcium, sodium citrate, stearic acid, glycerin and phthalic anhydride resin. In vials of 12.

Buffered Tablets Penicillin Calcium,

1. *A.D.A.*, Ed. 13, p. 104.

100,000 Units: Stated to contain penicillin calcium, sodium citrate, stearic acid, glycerin and phthalic anhydride resin. In vials of 12.

Dulcet Buffered Tablets Crystalline Penicillin G Potassium, 50,000 Units: Stated to contain crystalline penicillin G potassium, cane sugar, calcium carbonate, corn starch, saccharin sodium, magnesium stearate, talc and flavor. In vials of 12. Manufactured by Abbott Laboratories, North Chicago, Ill.

Anesthetics—Local[2]

Procaine HCl 2%, Epinephrine 1:50,000—"Oryl" Brand: Composition: See *A.D.R.*, Ed. 13, p. 61.

Procaine HCl 2%, Epinephrine 1:25,000—"Oryl" Brand: Composition: See *A.D.R.*, Ed. 13, p. 61.

Procaine HCl 2%, Neo-Synephrine HCl 1:3,500—"Oryl" Brand: Composition: See *A.D.R.*, Ed. 13, p. 61. Manufactured by Exodontia Products Co., Chicago. Distributed by the William Getz Corporation, Chicago.

Procaine HCl 4%, Neo-Synephrine 1:2500: Each cubic centimeter is stated to contain procaine hydrochloride, 0.04 Gm.; neo-synephrine hydrochloride (Stearns), 0.0004 Gm.; sodium bisulfite, 0.002 Gm.; in distilled water. Marketed in 2.5 and 2 cc. cartridges. Manufactured by the Proco-Sol Chemical Co., Inc., Philadelphia.

Abrasives[3]

Bentonite, U.S.P.—Bentonitum (Benton.) Bentonite is a native, colloidal, hydrated aluminum silicate.

Properties: It is a very fine, odorless, pale buff or cream-colored powder, free from grit, and has a slightly earthy taste. It is insoluble in water, but swells to approximately twelve times its volume when added to water. It is insoluble and does not swell in organic solvents.

Actions and Uses: Bentonite is sometimes used as a dentifrice ingredient. In selecting bentonite for this purpose, special precautions should be taken to assure that it is substantially free from grit. The designation "U.S.P." or "U.S.P. Grade" on the label is not sufficient assurance. Directions for testing for grit will be supplied by the Council upon request.

Bentonite: A brand of bentonite, U.S.P. Distributed by the Chattanooga Pharmacal Co., Chattanooga, Tenn.

BC Volclay Bentonite: A brand of bentonite, U.S.P. Distributed by the American Colloid Co., Chicago. Trademark 356,773.

Fibrin Ferments and Thromboplastic Substances[4]

Thrombin, 1,000 Units, Sterile: Thrombin is a water-soluble, white powder derived from bovine blood. It complies with the requirements of the Federal Security Agency and the National Institute of Health.

Manufactured by the Upjohn Company, Kalamazoo, Mich. Patent applied for. Trademark registered in U.S. Patent Office, Serial No. 429268, April 29, 1947.

Admission of a product to the list of *Accepted Dental Remedies* means that the product and the methods by which it was marketed at the time of consideration were not found to be in violation of the Council's published rules. Accepted products are reconsidered periodically. The files of the Council contain information on many drugs and dental cosmetics which is available on request, and inquiries are welcomed.—*Donald A. Wallace, Secretary.*

2. *A.D.R.*, Ed. 13, p. 48.
3. *A.D.R.*, Ed. 14 (in press).
4. *A.D.R.*, Ed. 13, p. 137.

PRELIMINARY COMMENTS ON DENTAL PRODUCTS

IN ORDER to provide helpful information promptly, the Council on Dental Therapeutics has authorized the publication of preliminary comments concerning commercial preparations which are within its scope. The comments are limited to clear-cut facts and references to previously published information and written opinions. The Council will authorize the publication of comprehensive status reports at a future time if they appear to be needed and will accept those products which, on investigation, are found to be eligible for inclusion in *Accepted Dental Remedies* in accordance with its rules.

The products listed below have not been accepted by the Council.

Ostabs Ammonium Mouth Wash Tablets

Ostabs Ammonium Mouth Wash Tablets: The product consists of purple tablets, each of which is stated to contain urea, 1 grain; dibasic ammonium phosphate, 3 grains; ammonium chloride, 3 grains; anhydrous dibasic calcium phosphate, 2 grains; corn starch; flavor, and color. The tablets are stated to be slightly alkaline.

No therapeutic indications are given on the label. An advertising booklet entitled *The New Therapeutic Weapon Against Caries* states in part, "In addition to an indicated value in Dental Caries, Ostabs are recommended in Acute and Sub-acute Gingivitis, Vincent's Infection, Ulcerative Stomatitis or Trench Mouth."

The Council has not accepted any products of this character. Their status is summarized briefly in the report, "Status of Dentifrices and Mouthwashes Which Contain Dibasic Ammonium Phosphate and Urea," *J.A.D.A.* 36:504 (June) 1948.

Buffalo Dental Prophylaxis Paste

Buffalo Dental Prophylaxis Paste: This preparation is stated to contain very fine pumice, 38.7 per cent; heavy chalk, 19.4 per cent; glycerin; glycerite of starch; soap; erythrosine (color), and rose, clove and cassia oils.

The Council on Dental Therapeutics has not accepted any brands of paste or powder intended for use in prophylaxis. Adequate clinical data concerning the cleansing effects of the various products which are commercially available have not yet been submitted to the Council.

Oral Calscorbate

Oral Calscorbate: Each tablet is stated to contain calcium ascorbate, 30 mg. (½ grain); dicalcium phosphate, 0.5 gm. (7½ grains); calciferol (vitamin D_2), 400 U.S.P. units; with excipients and flavor.

The claims made in the advertising for this product should be compared with the information given under "Calcium Compounds," "Vitamin C," and "Vitamin D" in *Accepted Dental Remedies.*[1] Calcium ascorbate is the calcium salt of ascorbic acid, which is vitamin C.

1. *A.D.R.*, Ed. 13, pp. 148, 188, 190.

A.D.A. WITHHOLDS ENDORSEMENT OF SCHOOL HEALTH SERVICE BILL S.1290

On March 9, 1948, hearings on S.1290 were held before the subcommittee on health of the Senate Committee on Labor and Public Welfare. S.1290, introduced by Leverett Saltonstall of Massachusetts in May, 1947, would authorize large federal appropriations to assist states in providing and maintaining school health services for the prevention, diagnosis and treatment of physical and mental defects and conditions.

Incorporated into the hearings was the following statement, submitted for the American Dental Association by Carl O. Flagstad, chairman of the Committee on Dental Legislation.

Although the American Dental Association is in accord with the worthy objectives of the bill, the improvement and protection of the health of the school children, it is concerned over some of the uncertainties of the bill.

1. The American Dental Association, through its component state associations and district dental societies, has for many years been fostering intensive programs for dental health in the school systems of our nation. It has been the consensus of opinion that the dental health programs within the school should be educational in their nature and, therefore, have been largely limited to dental examinations and oral health education. The Association is in accord with the general feeling of educators and school boards that treatment and dental care is not within the field of education and, therefore, logically belongs to the dental health services, public and private. The bill apparently would foster the treatment and care of dental disease by school health services. The committee should consider carefully the advisability of projecting the schools into the field of dental treatment and care.

2. The bill is not clear as to the manner in which the dental services shall be rendered. Will it be by the establishment of dental clinics with salaried dentists, or will it be on a fee for service basis? Will there be free choice of dentist or will it be regulated by the school health service?

The American Dental Association would wish a definite answer to these questions before it would give serious consideration to approval of the bill.

3. The bill apparently would make dental treatment and care available to all school children regardless of their ability to pay. The American Dental Association through its House of Delegates has frequently stated its policy in this matter as follows:

The responsibility for providing dental care must be borne in the same manner as the responsibility for providing food, shelter or any other essential of life. It is the American custom and tradition for the individual to attempt to supply these things for himself. If he cannot do so, the responsibility falls on the family, the community, the state, and the nation successively.

The Legislative committee, therefore, is instructed to oppose legislation which contemplates the rendering of free dental care to those who are able to pay for such services.

4. The committee is undoubtedly aware of the fact that there is in Congress a series of overall health bills which would encompass the provisions of this bill. Would it not be more efficient to foster health legislation which would make it possible to set up health programs for the entire child and adult population? Will this school health program reach the preschool children or a rather large percentage of our children who attend school only for a short period of time?

In view of these uncertainties, the American Dental Association must withhold endorsement of S.1290.

DR. FLAGSTAD'S STATEMENT AT HEARING ON SELECTIVE SERVICE ACT

REPRESENTATIVE W. G. Andrews of New York, on April 20, introduced a bill (H.R. 6274) into Congress to increase the strength of the armed forces of the United States. Known as the Selective Service Act of 1948, the bill provides that every male person in the United States between the ages of 18 and 31 shall register for service and that male persons between the ages of 19 and 26 shall be liable for service in the armed forces.

The bill provides for special registration of dentists, physicians and veterinarians who have not as yet reached age 45. Such persons called shall be liable for induction into the armed forces for a period not to exceed twenty-four months. Sufficient members of the professions would be inducted to provide a ratio not to exceed two dentists per thousand appointed or enlisted personnel, three physicians per thousand personnel and one veterinarian to two thousand personnel.

The bill further provides that dentists, physicians and veterinarians shall be inducted in the following order: (1) those who are less than 35 years of age and have had less than ninety days' prior military or naval service, (2) those who are more than 35 years of age and have had less than ninety days' prior military or naval service, (3) those who participated as medical or dental students in the Army or Navy specialized training program and have had more than ninety days' but less than twenty-four months' active service, (4) those whose total military or naval service is less than twenty-four months and (5) others as prescribed by the President.

Carl O. Flagstad, chairman of the Committee on Dental Legislation, represented the American Dental Association at the hearing held on the bill, April 20, by the Committee on Armed Services. Dr. Flagstad's statement follows:

The American Dental Association desires to express its appreciation for the invitation to appear at this hearing to discuss with you the dental profession's relation to the Selective Service Act of 1948 now under consideration. The Association wishes again to assure the government that it is ready to cooperate to the fullest extent in providing adequate dental service for the armed forces and hopes that the Congress will make provision for the autonomous direction of dental activities by the Dental Corps.

The Congress is undoubtedly aware of the fact that the dental profession has not yet recovered from the dislocations caused by the recent war when over twenty thousand of the profession were assigned to the military services. With approximately one-third of the profession withdrawn from private practice, it is reasonable to understand that adequate dental service to our civilian population was impossible. The years that have intervened since the return of the veterans have been extremely busy ones for the profession, in endeavoring to rehabilitate the dental health of our people.

The war years also upset the normal flow of dental graduates as, for a portion of the time, deferment of predental students was discontinued. Therefore, the dental graduates of this year are considerably below the normal number.

At the beginning of the war, the operations of Selective Service inducted into the service, as privates, a considerable number of dentists. The American Dental Association, believing that such procedure was a waste of dental manpower, was influential in having established the Procurement and Assignment Service. This was an arrangement whereby dentists were pro-

cured for professional service for the Army and Navy in lieu of induction through Selective Service. The American Dental Association cooperated with the Procurement and Assignment Service throughout the emergency in securing sufficient dentists to fill all quotas for dental officers requested by the armed services.

In order to meet the dental service requirements of the armed forces, it was necessary to draw heavily upon our profession and to procure them at ages considerably beyond the limit of 38 years as set by the draft. Therefore, in order to prevent some of the confusion experienced at the beginning of the last emergency, we respectfully request Congress to consider the following recommendations in preparing the present bill:

1. That dentists, regardless of their age, who are called to active duty, be commissioned and utilized in their professional capacity in the armed services.

2. That in addition to the deferment of dental students, a reasonable pool of predental students who may be within the age categories of the draft be deferred so as to assure a normal class of dental students in the coming years.

3. The creation of a special civilian board, directly responsible to the President, with similar functions to the former Procurement and Assignment Service, to evaluate the needs of the armed services and civilian dental services. This board should be given the authority by law to procure dentists to serve as officers in the Dental Corps.

It is recommended that the material contained in Section 5, (n) and (o) on pages 19 and 20 of the bill, be eliminated at least in so far as it concerns the dental profession, and that there be substituted in lieu thereof a provision based on the following recommendations:

That the President be authorized to re-establish the Procurement and Assignment Service, or a similar board, its purpose to be to evaluate the dental needs of the armed forces in relation to civilian needs; that the board shall be empowered to call into service dentists, as required, in such numbers, priority and age categories as deemed advisable.

It is suggested that the board, when created, consider for priority in procuring dentists all former A.S.T.P. and V-12 students who have not rendered any active military service, other than in school, and also all recent graduates who have not served on active duty in the military forces of the United States.

A survey of the present pool of dentists who would be available for service in this category indicates that, under the present contemplated strength of the armed forces, there would be sufficient dentists to supply the needs of the increased military services. In the event this does not meet the needs, the board would be empowered to develop additional categories on an equitable basis for the calling of dentists into service.

The American Dental Association offers its fullest cooperation to the Congress, to the armed services and to the proposed procurement board, in developing a Dental Corps adequate to take care of the needs of the personnel of the military services.

It should be continually kept in mind that the dental needs of the civilian population should be safeguarded in developing a program of dental services for the armed forces.

LIST OF DENTAL OFFICERS

SEPARATED FROM ARMY DENTAL CORPS

THE following list of dental officers separated from the Army Dental Corps does not include rank because such information is no longer furnished by the Surgeon General's Office. Publication will be given to other names as soon as possible.

Arkansas	
Harrison	Moore, James L.
Hughes	Nelson, Sterling D.
California	
Berkeley	Lew, Robert P.
Glendora	Norviel, Lewis D.
Inglewood	Budd, Edward G.
Livermore	Poco, Joseph M.
Los Angeles	Engelberg, Monroe
Los Angeles	Hammerschmitt, Julius E.
Los Angeles	Kerns, Alan M.
Los Angeles	Ross, Robert N., III
Montebello	Benton, Jack W.
North Hollywood	Markarian, Albert V.
Oakland	Jensen, Elbert A., Jr.
Oakland	Smith, George G.
Ontario	Monroe, Jack T.
Orange	Leichtfuss, Wilfred C.
Pasadena	Reed, William C.
San Anselmo	Gehres, Robert W.
San Francisco	McIntyre, Barclay J.
San Francisco	Quiros, Lauro R.
San Francisco	Wong, Ronald T.
San Francisco	Yee, Francis Q.
San Rafael	Walkmeister, Kenneth G.
Santa Ana	Langenbeck, Russel R.
Santa Cruz	Showalter, Carl H.
Santa Maria	Hoag, Robert A., Jr.
Colorado	
Denver	Levi, John T.
Denver	McGill, Nathan L.
Denver	Woods, Perry L.
Connecticut	
Hartford	Cohen, Jerry A.
Hartford	Graham, John R.
Hartford	Herbert, Irving M.
Hartford	Martino, Alfred A.
New Haven	Smith, Charles E.
Waterbury	Impresa, Michael B.
Delaware	
Wilmington	Shames, Norman A.
District of Columbia	
Washington	Lopez, George W. G.
Florida	
Lake Worth	McGee, Lotus H.
Miami	Benway, Emphy F.
Miami Beach	Syrop, Harold M.
Vero Beach	Damerow, Carl F.
Georgia	
Albany	Mooney, Andrew N.
Atlanta	Anderson, Arthur N., Jr.
Atlanta	Ward, Dillard C.
East Point	Buchanan, William T.
LaGrange	Layfield, Pearce H., Jr.
Tucker	Andrews, Walter P.
Idaho	
Driggs	Moss, Harold C.
Emmett	Westerberg, Bartlett R.
Illinois	
Aurora	Gillette, Howard E.
Aurora	Konrad, Arthur J.
Belvidere	Van Dyke, John J.
Carlinville	James, Ben J., II
Chester	Bilster, John E.
Chicago	Clark, Richard D.
Chicago	Druck, Charles S.
Chicago	Dziubak, Julius J.
Chicago	Josh, Joseph A.
Chicago	Joseph, Francis S.
Chicago	Lawlikowski, Leonard F.
Chicago	Lerman, Martin D.
Chicago	Niedzwiadek, Walter G.
Chicago	Podwika, Joseph J.
Chicago	Sarnat, David
Chicago	Schneider, Jack M.
Chicago	Schroeder, Edward W.
Chicago	Stecker, Henry W.
Chicago	Watkins, Raymond H.
Evanston	Chapman, Vaughn V.
Hamilton	Wait, Myron B.
Olney	Weber, James A., Jr.,
Ottawa	Karr, Guy A.
Peoria	Sandy, Guy L.
Sparta	Emons, Dean E.
Springfield	Johnson, Wilbur N.
Warrenville	Biestek, John P.
Waterloo	Schmitt, Carlyle A.
Wheaton	Schluchter, Roy T.
Indiana	
Bloomfield	Combs, William M.
Bloomington	McDaniel, Glen M.
Columbus	Marshall, Roy T.
New Albany	Stemm, Wilson E.
Iowa	
Atlantic	Clark, Addison P.
Dubuque	Powers, Thomas J.
Harlan	Kelley, Norbert J.
Humboldt	Olson, Arthur M.

Humboldt	Warren, Wayne M.
Iowa City	Owen, Richard R.
Sioux City	Mittleman, Isadore
Spencer	Larson, Leonard
Waterloo	Behrens, Charles Y.
Kansas	
Coffeyville	Harrington, Glenn C.
Kansas City	Henson, Frazier L.
Kentucky	
Canada	Smith, Wallace H.
Louisiana	
Lake Charles	Leveque, Malcolm J.
New Orleans	Busch, Frederick H.
New Orleans	Lonnegan, Joseph A.
Maine	
Augusta	Pike, George A.
Fort Kent	Cyr, Normand E.
South Brewer	Zitaner, Morris
Massachusetts	
Arlington	Keller, Stanley E.
Belmont	Cutler, Chester B.
Brockton	Montgomery, Daniel R.
Chicopee Falls	Rypysc, Stanley J.
Fitchburg	Miller, Albert M.
Holyoke	Firestone, Robert D.
Lynn	Sbarra, Carlo H.
Springfield	Meyer, Irving
Springfield	Noonan, Edward J., Jr.,
Watertown	Fantasia, Philip D.
W. Springfield	Burr, Howard E.
Worcester	Peters, Louis
Michigan	
Ann Arbor	Lumbert, Clifford W.
Detroit	Dillon, Edward T.
Holland	Ridenour, Elmer C.
Iron Mountain	Jacobs, Alfred G.
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DEATHS

Beatty, John K., Swissvale, Pa.; Pennsylvania College of Dental Surgery, 1903; died April 15; aged 67.

Black, Merle T., Los Angeles; died April 11; aged 52.

Brady, Harry E., Mill Hall, Pa.; Philadelphia Dental College, 1887; died April 9; aged 84.

Briggs, Elmer E., Philadelphia; Dental Department, George Washington University, 1913; died April 24.

Briscoe, E. H., Carrollton, Mo.; Dental School, Northwestern University, 1905; died in May.

Brown, Ralph E., Atlanta, Ga.; Atlanta-Southern Dental College, 1923; died April 13.

Bugbee, Nathan P., Springfield, Mass.; Pennsylvania College of Dental Surgery, 1896; died April 20; aged 81.

Deitch, Frank, St. Joseph, Mich.; Dental School, Northwestern University, 1901; died April 15; aged 71.

Doudna, Hugh M., Dental School, Marquette University, 1905; died April 26; aged 66.

Ford, Martin T., Chelsea, Mass.; died February 5; aged 70.

Foulkes, Bertram T., Orange, N.J.; Department of Dentistry, Medico-Chirurgical College of Philadelphia, 1913; died April 15; aged 60.

Fowler, Ernest, Los Angeles; died February 22; aged 63.

Gierisch, William C., Bountiful, Utah; School of Dentistry, University of Denver, 1919; died April 7; aged 65.

Gilden, Charles T., Ambler, Pa.; Philadelphia Dental College, 1892; died December 2; aged 76.

Gordon, John W., Dayton, Ohio; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1904; died April 26; aged 70.

Gunn, J. P., Gasden, Ala.; Southern Dental College, 1906; died April 10; aged 63.

Gurnsey, Harry K., Salt Lake City; School of Dentistry, University of Pennsylvania, 1918; died April 12; aged 51.

Hamilton, Alexander R., Montclair, N.J.; Pennsylvania College of Dental Surgery, 1905; died April 1.

Harris, Charles P., Los Angeles; died April 20; aged 75.

Hayllar, William D., Detroit; University of Michigan College of Dental Surgery, 1929; died April 20; aged 52.

Heaton, Numa C., Hollywood, Calif.; Philadelphia Dental College, 1894; died April 6; aged 80.

Hess, Frank B., Uniontown, Pa.; died December 30; aged 71.

James, Willis L., Burlington, N.J.; New York College of Dentistry, 1917; died April 6; aged 61.

Johnston, Henry, Menahga, Minn.; College of Dentistry, University of Minnesota, 1912; died April 14; aged 62.

Keefer, William J., Flint, Mich.; College of Dental Surgery, University of Michigan, 1928; died April 13; aged 42.

Kirk, R. C., Mobile, Ala.; Atlanta Dental College, 1908; died April 15; aged 61.

Kumpitsch, Peter F., Hartford, Conn.; died April 5; aged 76.

Lane, Vernon E., Laurelton, N.Y.; School of Dentistry, University of Pennsylvania, 1915; died April 27; aged 57.

Leraas, Arnold, Beulah, N.D.; School of Dentistry, University of Louisville, 1936; died April 5; aged 45.

Lewis, David N., Tucson, Ariz.; Chicago College of Dental Surgery, 1912; died April 16; aged 66.

Meyer, James K., New York; School of Dentistry, University of Pennsylvania, 1946; died April 23; aged 24.

Miller, John J., Chardon, Ohio; School of Dentistry, Western Reserve University, 1915; died April 14; aged 59.

Miller, Walter C., Coral Gables, Fla.; Atlanta Dental College, 1900; died February 15; aged 74.

Milligan, Edward L., Seattle; Dental School, Northwestern University, 1901; died April 15.

Mott, Raymond L., Rockaway, N.J.; Baltimore College of Dental Surgery, 1900; died April 19; aged 70.

Mount, Carl, Polo, Mo.; Western Dental College, 1917; died April 1; aged 56.

Murray, Harold H., Seattle; School of Dentistry, North Pacific College of Oregon, 1925; died May 13.

Naumann, Emil H., Mission, Texas; College of Dentistry, State University of Iowa, 1890; died May 10; aged 85.

Nelson, Albert C., Lincoln, Nebr.; Omaha Dental College, 1906; died April 16.

Newton, William W., Santa Monica, Calif.; died April 27; aged 75.

Nyce, Howard C., Valley Forge, Pa.; Pennsylvania College of Dental Surgery, 1900; died April 10.

Pace, George H., Dwight, Ill.; died April 25.

Parsons, Hubert F., Portland, Ore.; School of Dentistry, North Pacific College of Oregon, 1909; died April 15; aged 67.

Pope, Clinton M., Newton Highlands, Mass.; Harvard University Dental School, 1904; died April 11; aged 68.

Powell, Borden D., Dayton, Ohio; School of Dentistry, University of Pittsburgh, 1926; died January 21; aged 44.

Price, Weston A., Santa Monica, Calif.; College of Dental Surgery, University of Michigan, 1893; died January 23; aged 77.

Puckey, John A., Orbisonia, Pa.; School of Dentistry, University of Pennsylvania, 1899; died January 4; aged 70.

Quick, Glenn H., Schenectady, N.Y.; Baltimore College of Dental Surgery of the University of Maryland, 1917; died April 27; aged 54.

Quirk, Everett E., Jackson, Mich.; died January 11; aged 72.

Reid, Charles C., Jr., Crossett, Ark.; School of Dentistry, St. Louis University, 1916; died January 19; aged 57.

Reighner, George W., Erie, Pa.; died April 25; aged 76.

Reynolds, James E., Manchester, N. H.; Baltimore College of Dental Surgery, 1916; died December 19; aged 63.

Richardson, H. Sumner, Boston; died December 22.

Ritter, Clara T., Philadelphia; Pennsylvania College of Dental Surgery, 1902; died February 5.

Robinson, Lloyd C., Richmond, Va.; School of Dentistry, University of Pennsylvania, 1913; died December 28.

Robinson, Otis P., Brazil, Ind.; Ohio College of Dental Surgery, Dental Department of the University of Cincinnati, 1898; died January 7; aged 73.

Rossell, Charles F., Lansdale, Pa.; School of Dentistry, Temple University, 1912; died January 20; aged 65.

Row, Francis, Osgood, Ind.; Indiana Dental College, 1915; died January 12; aged 54.

Runde, L. C., Dubuque, Iowa; School of Dentistry, Marquette University, 1910; died February 24; aged 61.

Salisbury, M. P., Le Sueur, Minn.; died December 24; aged 90.

Salsbury, Henry L., New York; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1906; died December 25; aged 60.

Sawyer, J. C., Michigan City, Ind.; Dental School, Northwestern University, 1906; died March 29; aged 65.

Schwab, Carl F., Galva, Ill.; Chicago College of Dental Surgery, 1919; died January 27; aged 57.

Seery, Paul R., Baltimore, Md.; Baltimore College of Dental Surgery of the University of Maryland, 1926; died January 8.

Shannon, W. Webb, Milton, Pa.; died February 22; aged 53.

Sharrier, Charles P., Boise, Idaho; died April 18; aged 66.

Shimer, Otto N., Terre Haute, Ind.; School of Dentistry, Indiana University, 1925; died April 4; aged 48.

Sininger, Wade R., Cincinnati, Ohio; Cincinnati College of Dental Surgery, 1915; died February 26; aged 66.

Sitko, John, South Bend, Ind.; College of Dentistry, University of Iowa, 1938; died January 21; aged 33.

Smeja, Aloysius M., Rochester, N. Y.; School of Dentistry, University of Buffalo, 1916; died December 18; aged 54.

Smith, Ira M., Chicago; Chicago College of Dental Surgery, Dental Department of Loyola University, 1920; died January 16; aged 49.

Smith, Newton J., Rockford, Ill.; died April 24; aged 76.

Spoto, Joseph C., Rochester, N. Y.; School of Dentistry, University of Buffalo, 1923; died February 15; aged 50.

Stolitzky, Benjamin, Brooklyn; New York College of Dentistry, 1921; died January 25; aged 47.

Strauss, Milton W., Huntington, Ind.; Dental School, Northwestern University, 1901; died December 27; aged 73.

Stygar, Michael S., Derby, Conn.; School of Dentistry, St. Louis University, 1942; died February 21; aged 36.

Sullivan, Edmund F., Rockford, Ill.; Dental School, Northwestern University, 1914; died December 18; aged 56.

Summer, Peter D., Mobile, Ala.; died February 4; aged 68.

Sutherland, John R., Pittsburgh; died April 11.

Tanzey, Hugh G., Kansas City, Mo.; Western Dental College, 1901; died January 7; aged 68.

Tarrant, Frederick J., Rochester, N. Y.; Ohio College of Dental Surgery, University of Cincinnati, 1894; died February 3; aged 71.

Thoreson, C. A., Ashby, Minn.; Chicago College of Dental Surgery, 1916; died February 18; aged 64.

Tooley, Sam B., College Hill, Ohio; Cincinnati College of Dental Surgery, 1915; died January 16; aged 54.

Totten, Benjamin A., Clifton, Kansas; Kansas City Dental College, 1908; died February 8; aged 73.

Van Arsdall, Alexander L., Kansas City, Mo.; Western Dental College, 1899; died November 25; aged 72.

Waack, Henry C., Chicago; American College of Dental Surgery, 1891; died March 6; aged 83.

Wadsworth, William S., Medford, Mass.; Tufts College Dental School, 1923; died April 23; aged 49.

Walker, George P., Attalla, Ala.; died December 1; aged 69.

Walker, James O., Atlanta, Ga.; died January 17; aged 30.

Wallace, Jay T., New Berlin, N.Y.; School of Dentistry, Temple University, 1905; died February 12; aged 67.

Walsh, John M., Indianapolis; died January 8; aged 71.

Watson, Alexander L., Galesburg, Ill.; Pennsylvania College of Dental Surgery, 1894; died February 13; aged 83.

Wayde, Charles A., Pasco, Wash.; Illinois School of Dentistry, 1899; died February 18; aged 81.

Wettling, J. Martin, Honeoye Falls, N. Y.; died December 23; aged 57.

Whedon, Dwight O., Syracuse, N. Y.; New York College of Dentistry, 1895; died December 20; aged 74.

White, Benjamin B., Terre Haute, Ind.; Indiana Dental College, 1897; died March 28; aged 78.

White, William R., San Francisco; College of Physicians & Surgeons, 1928; died February 22; aged 50.

Whitney, John C., Elkhart, Ind.; died December 11; aged 73.

Wilbur, William C., Summerville, S. C.; died December 22; aged 87.

Wilhelm, Thomas A., Traverse City, Mich.; College of Dental Surgery, University of Michigan, 1903; died January 12; aged 68.

Willard, Summer P., Marlboro, Mass.; Dental School, Tufts College, 1890; died January 6; aged 81.

Williams, J. R., Shawneetown, Ill.; died January 14; aged 80.

Williams, Pryor A., Birmingham, Ala.; School of Dentistry, Vanderbilt University, 1926; died January 1; aged 54.

Williams, Russell, Chicago; Dental School, Northwestern University, 1920; died February 10; aged 51.

Wills, H. Clark, Connersville, Ind.; School of Dentistry, Indiana University, 1933; died January 6; aged 40.

Wilske, William J., Rockford, Ill.; died December 21; aged 67.

Winters, Charles, Seattle; School of Dentistry, North Pacific College of Oregon, 1906; died February 21; aged 65.

Wolff, J. Scott, Kansas City, Mo.; died January 8; aged 69.

Wright, Edward V., Narberth, Pa.; School of Dentistry, University of Pennsylvania, 1900; died December 15; aged 73.

Young, Koehler K., Massilon, Ohio; School of Dentistry, University of Denver, 1929; died in January.

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Rhode Island			A. A. Albert	84 Broad St., Pawtucket
South Carolina			J. R. Owings	201 E. North St., Greenville
South Dakota			E. W. Elmen	Sioux Falls
Tennessee			E. J. Justis	Exchange Bldg., Memphis
Texas			W. Ogle	313 Medical Arts Bldg., Dallas
Utah			S. Ballinger	1001 Tribune-Telegram Bldg., Salt Lake City
Vermont			J. A. Larrow	Middlebury
Virginia	April 11-13, 1949	Roanoke	J. E. John	804 Medical Arts Bldg., Roanoke
Washington			F. J. Dingler	1502 Medical & Dental Bldg., Seattle 1
West Virginia			C. J. Gavelda	Clarksburg
Wisconsin			R. A. Mason	964 N. 27th St., Milwaukee
Wyoming			J. D. McNiff	208 Grand Ave., Laramie

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Arizona	Oct. 6-9		R. K. Trueblood	24 N. Second Ave., Glendale
California	July 26	San Francisco	K. I. Nesbitt	Room 307, 507 Polk St. San Francisco 2
Florida	June 28-July 3	Jacksonville	A. W. Kellner	P. O. Box 155, Hollywood
Massachusetts	July 12-14	Boston	J. C. Wilson	413 N. State House, Boston
North Carolina	June 28-July 1	Raleigh	F. O. Alford	1109 Liberty Life Bldg., Charlotte 2
North Dakota	July 11-15	Fargo	W. J. Ford	Fargo
Ohio	June 28-July 3*	Columbus Cleveland	E. D. Lowry	79 E. State St., Columbus
South Carolina	July 8-11		E. G. Bumgardner	1517 Hampton St., Columbia 29

*Dental and dental hygiene examination.

OTHER MEETINGS

Name	Date	City	Secy. or Chm.	Address
American Association for the Advancement of Science, Centennial Celebration	Sept. 13-17	Washington	H. Shapley Chm. Policy Comm.	1515 Massachusetts Ave., Washington 5
American Board of Oral Surgery	Sept. 7-8*	Chicago	L. M. FitzGerald Secy.	718 Roshek Bldg., Dubuque
American Dental Assistants Association	Sept. 13-16	Chicago	Mary L. Martin	610 Jefferson Ave., LaPorte, Ind.
American Dental Association, Eighty-Ninth Annual Meeting	Sept. 13-17	Chicago	H. Hillenbrand Secy.	222 E. Superior St., Chicago 11
American Dental Hygienists' Association, Twenty-Fifth Annual Meeting	Sept. 13-17	Chicago	A. Rebekah Fisk Secy.	1704 N. Troy St., Arlington, Va.
American Dental Laboratories Association, First Annual Convention	Sept. 23-26	Washington	H. A. Herensperger Chm. Program Comm.	1930 Chestnut St., Philadelphia 3
American Dental Society of Europe	July 27-30	London	K. C. Campbell Secy.	88 Portland Place, London, W. 1
American Public Health Association, Seventy-Sixth Annual Meeting	Nov. 8-12	Boston	R. M. Atwater Secy.	1790 Broadway, New York, 19
American Society of Oral Surgeons, Thirtieth Annual Meeting	Sept. 9-11	Chicago	H. Bear Secy.	1112 E. Clay St., Richmond 19, Va.
Central Section of the American Association of Orthodontists	Oct. 25-26	Lincoln, Nebr.	E. E. Shepard Secy.	4500 Olive St., St. Louis, Mo.
Federacao Odontologica Brasileiro, Fourth Congresso	July 1949	Recife, Brazil	R. Ewerton	277 Avenida Rio Branco, Rio de Janeiro
Federation Dentaire Internationale, Annual Meeting	August 3-7	Dublin, Eire	M. W. Watry Secy.	35 Rue Souveraigne, Brussels, Belgium
French Association for the Advancement of Science, Dental Section Twenty-Fifth Annual Meeting	July	Geneva, Switzerland	R. Sudaka Pres.	143 Avenue Emile-Zola, Paris 15
Greater New York Dental Meeting, Twenty-Fourth Annual Meeting	Dec. 6-10	New York	Mabel Purdy Secy.	Rm. 106A, Hotel Pennsylvania, New York 1

Name	Date	City	Secy. or Chm.	Address
Montreal Dental Club, Twenty-Fourth Annual Fall Clinic	Oct. 27-29	Montreal	M. L. Donigan Director	Drummond Medical Bldg., Montreal 25
National Board of Dental Examiners	Dec. 6-7†		G. L. Teall Secy.	Box 71, Hiawatha, Kan.
National Dental Association, Thirty-Fifth Anniversary	August 9-13	Newark, N. J.	J. A. Jackson Secy.	Box 197, Charlottesville, Va.
New England Dental Society, Annual Meeting	Oct. 27-28	Boston	J. F. Barton Secy.	43 Farmington Ave., Hartford 5
New Orleans Dental Association, New Orleans Dental Conference	Oct. 24-27	New Orleans	L. J. Schoeny Chm. Pub. Relations	Maison Blanche Bldg., New Orleans
Northeastern Society of Orthodontists	Nov. 21-22	New York	O. Jacobson Secy.	35 West 81st St., New York
Trade Union of Hungarian Physicians, Annual Meeting of the Section of Stomatology	Sept. 4-12	Budapest, Hungary	J. Kende Secy.	Nador-U. 32. Budapest, V
Twenty-Second Journees Dentaires de Paris	Nov. 24-28	Paris	M. R. DuPont Secy.	5, Rue Garanciere, Paris
Wisconsin Dental Economic Study Club	Aug. 18-20	Madison	M. M. Tuttle Secy.	20 N. Carroll St., Madison 3

*Examinations for certification.
†Examinations will be held in schools where there are five or more candidates.